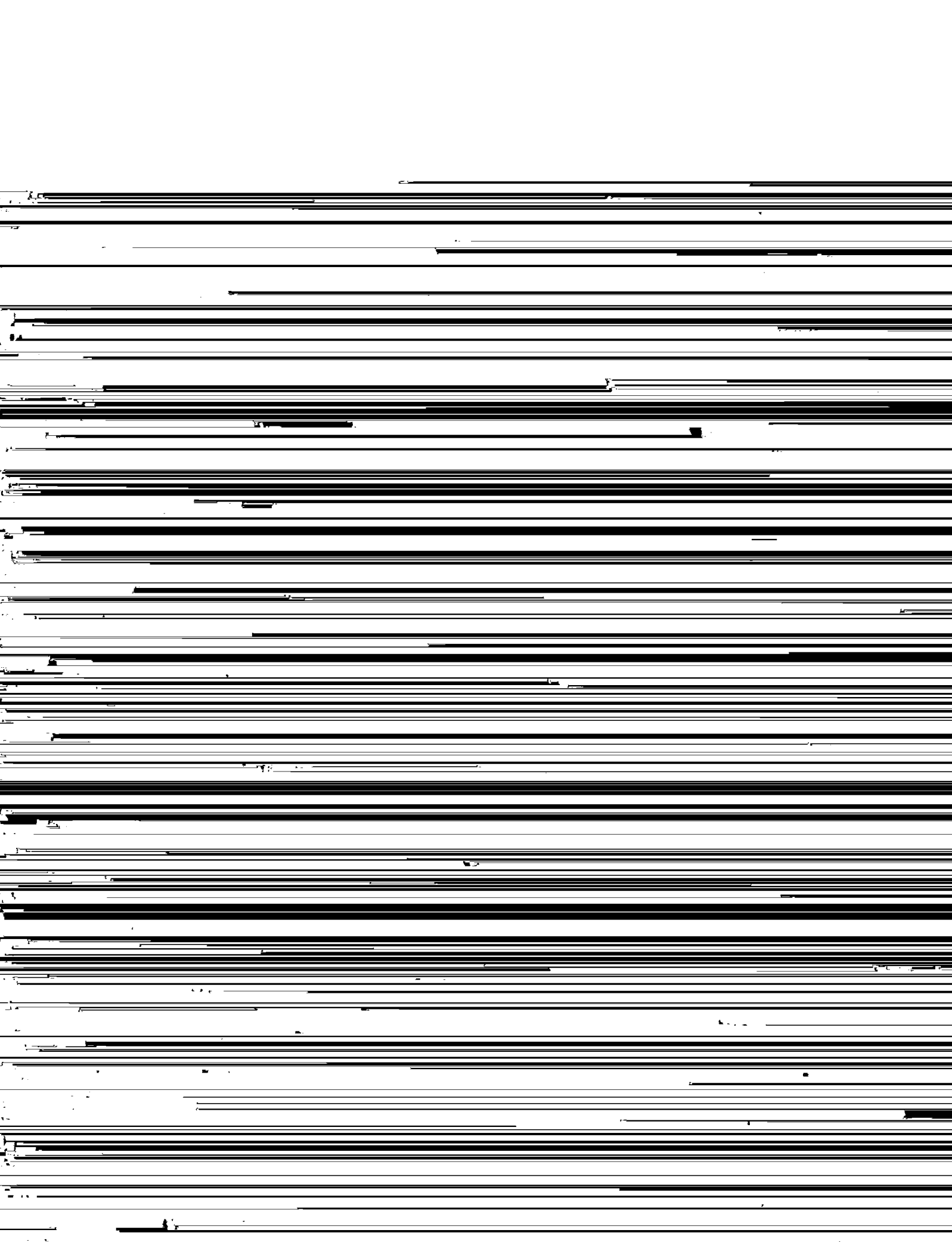
Major fieldwork for this soil survey was done in the period 1958–64. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in the publication re[redacted] in the county in 1966. This survey was made cooperatively



SOIL SURVEY OF WASHINGTON COUNTY, ARKANSAS

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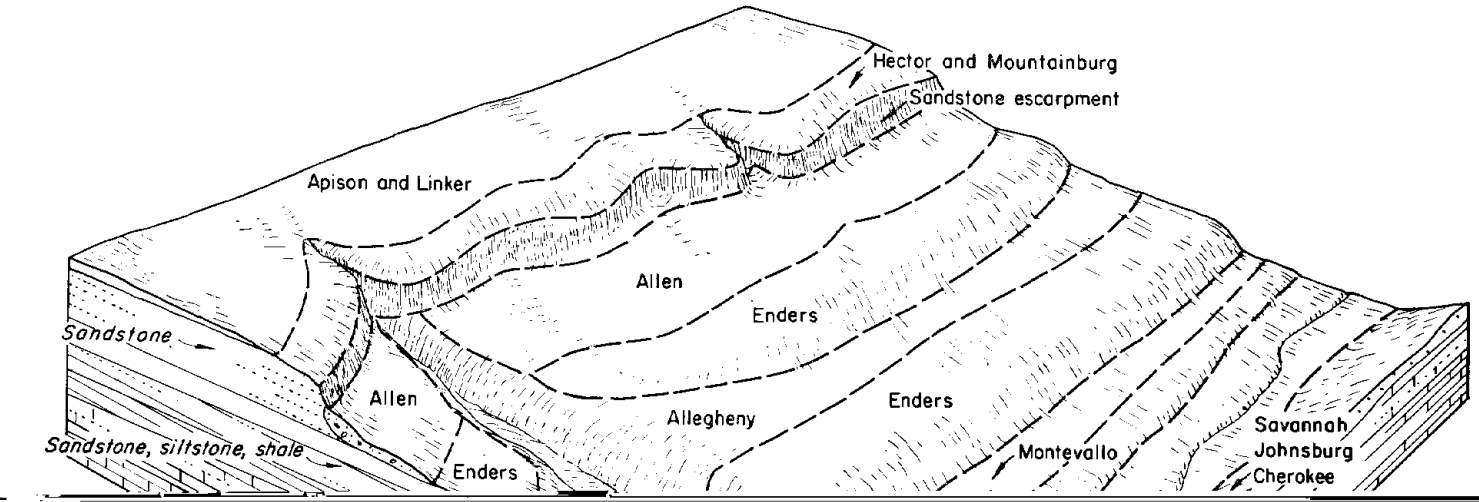
UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION

WASHINGTON COUNTY is in the northwestern part of Arkansas (fig. 1). It is about 32 miles from north to south and about 32 miles from east to west. The total area is 616,320 acres, or 963 square miles. In 1960, the population totaled 55,797. Fayetteville, the county seat, is on the northern edge of the Boston Mountains. It is about 1,250 to 1,720 feet above sea level.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Enders and Razort, for

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Enders gravelly loam, 3 to 8 percent slopes, is one of several phases of a soil type that

The soil scientists set up trial groups based on the yield and practice tables and other data. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present


Hector and Mountainburg
Sandstone escarpment
Apison and Linker
Allen
Enders
Sandstone
Allen
Allegheny
Enders
Sandstone, siltstone, shale
Enders
Montevallo
Savannah
Johnsburg
Cherokee

and are less than a fourth of a mile to no more than half a mile wide. Most are about 1,700 to 1,900 feet above sea level. A few are as much as 2,300 feet high. The rock formations consist of alternate layers of acid shale and sandstone. The caprock is hard sandstone. This association occupies about 39 percent of the county. It is mainly in the southern half.

Enders and Allegheny soils are on the mountainsides. Hector soils are on ridgetops.

Enders soils make up about 30 percent of this association. Their surface layer, which is weathered material brought down from higher slopes, is brown gravelly or stony loam 8 to 12 inches thick. Their subsoil is mottled red and gray, plastic clay 3 to 6 feet thick.

Allegheny soils make up about 25 percent of the association. They formed mainly in deposits 3 to 15 feet thick of material that weathered from sandstone and shale and then washed or rolled downhill from higher lying slopes. They contain few to many sandstone pebbles and stones. Their surface layer is dark brown loam, and their subsoil

a mile to 3 miles wide. They are about 1,600 to 2,000 feet above sea level; a few are as much as 2,400 feet high. The gradient is 3 to 12 percent. This association occupies about 8 percent of the county. It is in the southern half. The largest area is near Lincoln.

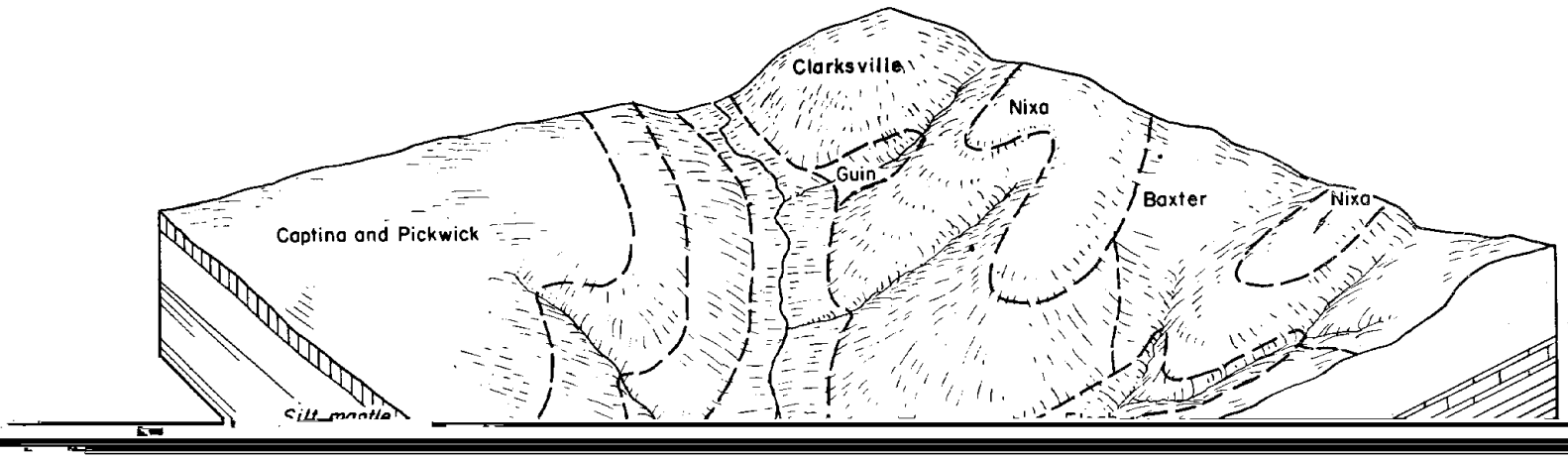
Linker and Apison soils are generally on the middle parts of the mountaintops, and Hector soils are along the margins and on knobs. All developed in material weathered from sandstone and shale.

Linker soils make up about 35 percent of this association. Their surface layer is brown loam. Their subsoil is red or yellowish-red, friable loam or sandy clay loam that is 2 to 3 feet thick over sandstone. In places these soils are gravelly.

Apison soils make up about 15 percent of the association. Their surface layer is brown or dark grayish-brown loam. Their subsoil is strong-brown to yellowish-brown, friable loam to clay loam that is 2 to 3 feet thick over sandstone. In places these soils are gravelly.

Hector soils make up about 15 percent of the association

level. The gradient is mainly 3 to 20 percent. This associa- adjacent to Cleora soils. Savannah soils, which have smooth


Clarksville
Nixa
Guin
Baxter
Nixa
Captina and Pickwick

Captina and Pickwick soils developed in loamy material essentially free of gravel. Nixa soils developed in cherty limestone.

Captina soils make up about 32 percent of this association. Their gradient is mainly 2 to 5 percent. Their surface layer is brown silt loam 6 to 10 inches thick. Their subsoil is silt loam or silty clay loam. To a depth of 18 to 28 inches, this layer is yellowish brown or strong brown and is friable. Below this depth it is mottled gray, brown, and yellowish red and is compact and brittle.

Nixa soils make up about 17 percent of the association. Their gradient is mainly 5 to 8 percent. Their surface layer is grayish-brown or brown cherty silt loam 7 to 11 inches thick. Their subsoil is yellowish-brown to strong-brown cherty silt loam. It extends to a depth of 14 to 24 inches and is underlain by fractured chert bedrock, the cracks in which are filled with compact, brittle silt loam.

Pickwick soils make up about 16 percent of the association. Their gradient is mainly 2 to 5 percent. Their surface layer is brown or dark-brown silt loam 4 to 10 inches thick. Their subsoil is silty clay loam. To a depth of about 18 to 28 inches, this layer is friable and is red or yellowish red. Below this depth it is slightly compact and brittle and is mottled red, gray, and brown.

The rest of the association consists of Clarksville, Baxter, and Guin soils, which are on steep slopes; Jay and

Razort soils make up about 30 percent of this association. Their surface layer is dark-brown to very dark brown silt loam 7 to 15 inches thick. Their subsoil is friable, dark yellowish-brown or dark-brown silt loam and is 2 feet to several feet thick. Few areas are gravelly. Some areas are subject to overflow.

Captina soils make up about 25 percent of the association. Their surface layer is brown or dark grayish-brown silt loam 4 to 10 inches thick. Their subsoil is silty clay loam or silt loam. To a depth of 18 to 28 inches, this layer is yellowish brown or strong brown and is friable. Below this depth it is mottled gray and brown and is compact and brittle.

Pembroke soils make up about 25 percent of the association. Their surface layer is dark-brown silt loam 8 to 18 inches thick. Their subsoil is yellowish-red to dark-red, friable silt loam or silty clay loam and is 3 feet to several feet thick.

The rest of the association consists of Johnsburg, Guin, and Sloan soils.

More than 90 percent of this association is cleared. Wooded areas are mostly along streambanks. The cleared areas are parts of the farms described in associations 6 and 7. Some are pastured, some are used for hay, and some are cultivated to feed crops for livestock. Beef cattle and broilers are important on most of the farms.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Allegheny gravelly loam, 3 to 8 percent slopes	1, 223	0. 2	Hector-Mountainburg stony fine sandy loams, 3 to 40 percent slopes	37, 030	6. 2
Allegheny gravelly loam, 3 to 8 percent slopes, eroded	1, 421	. 2	Jay silt loam, 1 to 3 percent slopes	2, 220	. 4
Allegheny gravelly loam, 8 to 12 percent slopes, eroded	1, 208	. 2	Jay silt loam, 3 to 8 percent slopes	2, 410	. 4
Allegheny stony loam, 8 to 12 percent slopes	1, 531	. 2	Johnsburg silt loam	11, 572	1. 9
Allegheny stony loam, 12 to 40 percent slopes	5, 007	. 8	Johnsburg complex, mounded	974	. 2
Allen loam, 3 to 8 percent slopes, eroded	1, 249	. 2	Leaf silt loam	3, 648	. 6
Allen loam, 8 to 12 percent slopes, eroded	1, 534	. 2	Leaf complex, mounded	1, 442	. 2
Allen loam, 12 to 20 percent slopes, eroded	751	. 1	Linker loam, 1 to 3 percent slopes	1, 016	. 2
Allen soils, 8 to 20 percent slopes	5, 038	. 8	Linker loam, 3 to 8 percent slopes, eroded	17, 820	2. 9
Allen stony loam, 12 to 35 percent slopes	2, 696	. 4	Linker gravelly loam, 3 to 8 percent slopes, eroded	5, 199	. 8
Allen-Hector complex, 20 to 40 percent slopes	25, 755	4. 2	Linker gravelly loam, 8 to 12 percent slopes	923	. 1
Allen-Hector complex, 40 to 55 percent slopes	9, 037	1. 5	Montevallo soils, 3 to 12 percent slopes	1, 818	. 3
Apison loam, 1 to 3 percent slopes	801	. 1	Montevallo soils, 12 to 25 percent slopes	225	(1)
Apison loam, 3 to 8 percent slopes, eroded	5, 973	1. 0	Nixa cherty silt loam, 3 to 8 percent slopes	32, 806	5. 3
Apison gravelly loam, 3 to 8 percent slopes, eroded	1, 170	. 2	Nixa cherty silt loam, 8 to 12 percent slopes	5, 633	. 9
Baxter cherty silt loam, 3 to 8 percent slopes	625	. 1	Pembroke silt loam, 1 to 3 percent slopes	2, 097	. 3
Baxter cherty silt loam, 8 to 12 percent slopes	1, 155	. 2	Pembroke silt loam, 3 to 6 percent slopes, eroded	4, 063	. 7
Baxter cherty silt loam, 12 to 20 percent slopes	1, 628	. 3	Pembroke gravelly silt loam, 3 to 8 percent slopes, eroded	1, 769	. 3
Baxter cherty silt loam, 20 to 45 percent slopes	9, 969	1. 6	Pickwick gravelly loam, 3 to 8 percent slopes, eroded	1, 087	. 2
Captina silt loam, 1 to 3 percent slopes	12, 598	2. 0	Pickwick gravelly loam, 8 to 12 percent slopes, eroded	598	. 1
Captina silt loam, 3 to 6 percent slopes	4, 763	. 8	Pickwick silt loam, 1 to 3 percent slopes	2, 376	. 4
Captina silt loam, 3 to 6 percent slopes, eroded	17, 748	2. 9	Pickwick silt loam, 3 to 8 percent slopes, eroded	16, 613	2. 7
Cherokee silt loam	1, 190	. 2	Razort silt loam, occasionally flooded	4, 435	. 7
Cherokee complex, mounded	1, 528	. 2	Razort gravelly silt loam, occasionally flooded	5, 421	. 9
Clarksville cherty silt loam, 12 to 60 percent slopes	40, 807	6. 6	Razort loam	5, 449	. 9
Cleora fine sandy loam	10, 917	1. 8	Rock land	2, 161	. 3
Elsah cobbly soils	6, 310	1. 0	Samba silt loam	2, 559	. 4
Elsah gravelly soils	5, 392	. 9	Samba complex, mounded	317	(1)
Enders gravelly loam, 3 to 8 percent slopes	1, 077	. 2	Savannah fine sandy loam, 1 to 3 percent slopes	3, 687	. 6
Enders gravelly loam, 3 to 8 percent slopes, eroded	3, 571	. 6	Savannah fine sandy loam, 3 to 8 percent slopes, eroded	17, 304	2. 8
Enders gravelly loam, 8 to 12 percent slopes	875	. 1	Sloan silt loam	6, 480	1. 1
Enders gravelly loam, 8 to 12 percent slopes, eroded	2, 500	. 4	Sogn rocky silt loam	1, 595	. 2
Enders stony loam, 3 to 12 percent slopes	9, 859	1. 6	Summit complex, mounded	539	. 1
Enders-Allegheny complex, 8 to 20 percent slopes	70, 389	11. 4	Summit silty clay, 0 to 1 percent slopes	4, 605	. 7
Enders-Allegheny complex, 20 to 40 percent slopes	95, 395	15. 5	Summit silty clay, 1 to 3 percent slopes	972	. 2
Fayetteville fine sandy loam, 3 to 8 percent slopes, eroded	7, 633	1. 2	Summit silty clay, 3 to 8 percent slopes, eroded	2, 157	. 3
Fayetteville fine sandy loam, 8 to 12 percent slopes, eroded	2, 364	. 4	Summit silty clay, 8 to 12 percent slopes, eroded	712	. 1
Fayetteville fine sandy loam, 12 to 20 percent slopes, eroded	813	. 1	Summit stony silty clay, 3 to 12 percent slopes, eroded	2, 310	. 4
Fayetteville stony fine sandy loam, 12 to 35 percent slopes	1, 109	. 2	Summit stony silty clay, 12 to 25 percent slopes, eroded	983	. 2
Fayetteville-Hector complex, 20 to 40 percent slopes	4, 953	.8	Taloka complex, mounded	1, 399	. 2
Guin cherty silt loam, 3 to 8 percent slopes	3, 442	. 6	Taloka silt loam, 0 to 1 percent slopes	2, 459	. 4
Hector-Mountainburg gravelly fine sandy loams, 3 to 8 percent slopes	4, 626	. 8	Taloka silt loam, 1 to 3 percent slopes	1, 945	. 4
Hector-Mountainburg gravelly fine sandy loams, 8 to 12 percent slopes	1, 898	. 3	Dumps	26	(1)
			Gravel pits	32	(1)
			Lime quarry	22	(1)
			Shale outcrops	36	(1)
			Water	5, 848	. 9
			Total	616, 320	100. 0

[1] Less than 0.05 percent.

Allegheny Series

The Allegheny series consists of well-drained, moderately permeable soils in coves, on benches, and on foot slopes of the Boston Mountains. The upper part of these soils developed in colluvium derived from acid sandstone, siltstone, and shale, and the lower part in residuum derived from acid shale. The slope range is 3 to 40 percent.

Allegheny soils are associated with Enders, Allen, Savannah, Mountainburg, and Hector soils. They differ from Enders soils in having a less clayey subsoil that is brown instead of red. In comparison with Allen soils, they have a strong-brown or yellowish-brown, instead of a yellowish-red or red, subsoil and are finer textured in the lower part of the subsoil and in the underlying material. They lack the mottled fragipan that is typical of Savannah soils. They are deeper and have a thicker, more evident subsoil than the shallow Mountainburg and Hector soils.

Representative profile (Allegheny stony loam in an area of Enders-Allegheny complex, 8 to 20 percent slopes, in a hardwood forest; NW¼SW¼SW¼ sec. 17, T.14 N., R. 28 W.):

O1—1 inch to 0, hardwood leaf and twig litter.

A11— 0 to 2 inches, dark-brown (7.5YR 3/2) stony loam; moderate, fine, granular structure; very friable; many roots; many worm casts; 20 percent sandstone; slightly acid; abrupt, smooth boundary.

A12—2 to 5 inches, dark-brown (10YR 3/3) stony loam; weak, fine, granular structure; very friable; many roots; 20 percent sandstone; medium acid; clear, wavy boundary. A1 horizon 1 to 6 inches thick.

A3—5 to 13 inches, dark-brown (10YR 4/3) stony loam; weak, fine, subangular blocky structure; friable; 20 percent sandstone; many roots; medium acid; clear, wavy boundary. 4 to 10 inches thick.

B21t—13 to 30 inches, dark yellowish-brown (10YR 4/4) stony clay loam; moderate, fine, subangular blocky structure; friable; thin clay films in pores; 30 percent sandstone; common, small, hard, dark-colored concretions; medium acid; gradual, irregular boundary. 12 to 25 inches thick.

B22t—30 to 43 inches, yellowish-brown (10YR 5/6) stony clay loam; moderate, fine, subangular blocky structure; firm; common, thin clay films in pores and few, patchy clay films on ped faces; common vesicular and tubular pores; 25 percent sandstone; many, small, dark-colored concretions; medium acid; clear, irregular boundary. 12 to 25 inches thick.

IIB3—43 to 60 inches, yellowish-brown (10YR 5/6) stony silty clay; common, medium, distinct, light brownish-gray mottles that increase in number with increasing depth; weak, medium, subangular blocky structure; firm; few roots; many dark-colored concretions; 25 percent sandstone; strongly acid; gradual, wavy boundary. 8 to 20 inches thick.

IIC—60 to 74 inches +, variegated light-gray (10YR 7/2) and yellowish-brown (10YR 5/6) clay; few, fine, distinct, yellowish-red (5YR 4/6) mottles; massive; firm; plastic; few roots; strongly acid. 10 to 60 inches thick.

The A1 horizon is dark grayish-brown (10YR 4/2), very dark grayish-brown (10YR 3/2), or dark-brown (10YR 3/3, 7.5YR 3/2) stony or gravelly loam. The A2 horizon, where present, is yellowish-brown (10YR 5/4), brown (10YR 4/3), or dark yellowish-brown (10YR 4/4) stony or gravelly loam. The A3 horizon is dark-brown (10YR 4/3, 3/3) or dark yellowish-brown (10YR 4/4) stony loam or gravelly loam. In cultivated areas the Ap horizon is dark brown (10YR 4/3, 3/3) or dark grayish brown (10YR 4/2) and is 4 to 8 inches thick. The B1 horizon, where present, [illegible] variegated with strong brown (7.5YR 5/6), yellowish brown (10YR 5/4), light brownish gray (10YR 6/2), and intermediate colors. The IIC horizon is silty clay or clay and is variegated with yellowish red, light gray, and yellowish brown. In places it contains lenses of weathered shale. Typically, each horizon is 15 to 50 percent sandstone fragments up to 3 feet in diameter. In places more than 50 percent of the surface is covered with coarse fragments. The B horizon is less than 10 percent coarse fragments in places. The depth to shale, sandstone, or siltstone ranges from 4 to 10 feet. The reaction is medium acid or strongly acid in the A horizon and medium acid to very strongly acid in the B2t, IIB, and IIC horizons.

Allegheny gravelly loam, 3 to 8 percent slopes (AeC).—This soil occurs mainly as long, narrow areas that range from 5 to 30 acres in size. Included in mapping were nongravelly spots and small areas of Allen, Savannah, and Enders soils.

The surface layer is dark-brown gravelly loam 7 to 14 inches thick. The subsoil extends to a depth of 35 to 55 inches. The upper part is yellowish-brown or strong-brown gravelly clay loam. The lower part is mottled red and gray, plastic clay.

This soil is strongly acid. It has low fertility and responds moderately well to fertilizer and lime. The available water capacity is moderate. The root zone is 3 feet or more thick.

This soil is well suited to hay crops, pasture grasses, and small grain and is moderately well suited to corn and other row crops. It is also moderately well suited to upland oak, shortleaf pine, hickory, black locust, and black walnut. Most of the acreage either is used for hay or pasture crops or is reverting to hardwoods. Runoff is medium, and the erosion hazard is severe. (Capability unit IIIe–2; woodland group 6; wildlife group 3; no range site classification)

Allegheny gravelly loam, 3 to 8 percent slopes, eroded (AeC2).—This soil occurs mainly as long, narrow areas that range from 10 to 35 acres in size. Included in mapping were nongravelly spots and small areas of Allen, Savannah, and Enders soils. There are a few rills and shallow gullies.

The surface layer is dark-brown gravelly loam 4 to 8 inches thick. In spots the plow layer is a mixture of the surface layer and material from the subsoil. The subsoil extends to a depth of 30 to 50 inches. The upper part is yellowish-brown or strong-brown gravelly clay loam. The lower part is mottled red and gray, plastic clay.

This soil is strongly acid. It has low natural fertility and responds moderately well to fertilizer and lime. The available water capacity is moderate. The root zone is 3 feet or more thick.

This soil is moderately well suited to hay crops, pasture grasses, small grain, and corn and other row crops, and to upland oak, shortleaf pine, hickory, and black walnut. Part of the acreage is used for hay or pasture crops, and the rest is reverting to hardwoods. Runoff is medium, and the erosion hazard is severe. (Capability unit IIIe–2; woodland group 6; wildlife group 3; no range site classification)

Allegheny gravelly loam, 8 to 12 percent slopes, eroded (AeD2).—This soil occurs mainly as long, narrow areas that range from 5 to 30 acres in size. Included in mapping were spots of Allen, Savannah, and Enders soils.

The subsoil extends to a depth of 30 to 50 inches. The upper part is yellowish-brown or strong-brown, gravelly [redacted] The surface layer is dark-brown stony loam 7 to 14 inches thick. The subsoil extends to a depth of 25 to 55

60 inches thick. Sandstone fragments up to 10 inches in diameter make up as much as 15 percent of the soil mass. The depth to bedrock ranges from 4 to 15 feet.

This soil is medium acid. It has low natural fertility and responds well to fertilizer and lime. The available water capacity is moderate. The root zone is 4 feet or more thick.

This soil is well suited to pasture grasses, hay crops, corn, and small grain, and to apples and strawberries. It is moderately well suited to upland oak, shortleaf pine, hickory, and black walnut. The entire acreage has been cultivated, but now part of it is used for pasture or hay crops and the rest is reverting to hardwoods. Runoff is medium, and the erosion hazard is severe. (Capability unit IIIe–2; woodland group 6; wildlife group 3; no range site classification)

Allen loam, 8 to 12 percent slopes, eroded (AlD2).—This soil occurs on narrow mountain benches. Most areas are between 5 and 40 acres in size. Included in mapping were gravelly spots and small areas of Allegheny, Enders, and Savannah soils. There are a few rills and shallow gullies.

The surface layer, 5 to 8 inches thick, is dark brown or dark yellowish brown. In spots the plow layer is a mixture of the surface layer and material from the subsoil. The finer textured part of the subsoil is yellowish-red or dark-red clay loam, loam, or silty clay loam. It is 30 to 60 inches thick. Sandstone fragments up to 10 inches in diameter make up as much as 15 percent of the soil mass. The depth to bedrock ranges from 4 to 15 feet.

This soil is medium acid. It has low natural fertility and responds moderately well to fertilizer and lime. The available water capacity is moderate. The root zone is 4 feet or more thick.

This soil is poorly suited to clean-tilled crops but is well suited to hay crops, pasture grasses, and small grain. It is moderately well suited to upland oak, shortleaf pine, hickory, and black walnut. The entire acreage has been cultivated, but now part of it is used for hay or pasture crops and the rest is reverting to hardwoods. Runoff is rapid, and the erosion hazard is very severe. (Capability unit IVe–1; woodland group 6; wildlife group 3; no range site classification)

Allen loam, 12 to 20 percent slopes, eroded (AlE2).—This soil occurs on narrow mountain benches. Most areas are between 5 and 40 acres in size. Included in mapping were gravelly spots and small areas of Allegheny and Enders soils. There are a few rills and shallow gullies.

The surface layer, 5 to 8 inches thick, is dark brown or dark yellowish brown. In spots the plow layer is a mixture of the surface layer and material from the subsoil. The finer textured part of the subsoil is yellowish-red or dark-red clay loam, loam, or silty clay loam. It is 30 to 60 inches thick. Sandstone fragments up to 10 inches in diameter make up as much as 15 percent of the soil mass. The depth to bedrock ranges from 4 to 15 feet.

This soil is medium acid. It has low natural fertility and responds well to fertilizer and lime. The available water capacity is moderate. The root zone is 4 feet or more thick.

This soil is well suited to pasture grasses, hay crops, corn, and small grain, and to apples and strawberries. It is moderately well suited to upland oak, shortleaf pine, hickory, and black walnut. The entire acreage has been cultivated, but now part of it is used for pasture or hay crops and the rest is reverting to hardwoods. Runoff is rapid, and the erosion hazard is severe. (Capability unit VIe–1; woodland group 6; wildlife group 6; no range site classification)

Allen soils, 8 to 20 percent slopes (AnE).—These soils occur on long, narrow benches. Most areas are between 20 and 60 acres in size. The slope is concave. Included in mapping were spots of Allegheny and Savannah soils.

The surface layer of these soils is about 50 percent gravelly loam, 25 percent stony loam, and 25 percent loam. It is dark brown or dark yellowish brown and is 6 to 9 inches thick. The finer textured part of the subsoil is yellowish-red, red, or dark-red loam, clay loam, or silty clay loam. It is 30 to 60 inches thick. In places it is gravelly or stony. The steeper, gravelly and stony soils are generally on the uphill sides of the benches or in the more narrow areas.

These soils are medium acid. They have low natural fertility and respond moderately well to fertilizer and lime. The available water capacity is moderate. The root zone is 4 feet or more thick.

These soils are easy to till except in stony areas. They are well suited to hay crops and pasture grasses and are moderately well suited to upland oak, shortleaf pine, hickory, and black walnut. Except for steep, stony areas, most of the acreage has been cultivated. Now most of it is used for hay or pasture crops. Runoff is rapid, and the erosion hazard is severe. (Capability unit VIe–1; woodland group 7; wildlife group 6; no range site classification)

Allen stony loam, 12 to 35 percent slopes (AoF).—This soil occurs on long, narrow mountain benches. Most areas are between 20 and 80 acres in size. Included in mapping were spots of Allegheny and Enders soils.

The surface layer, 6 to 9 inches thick, is dark brown or dark yellowish brown. The finer textured part of the subsoil, 30 to 60 inches thick, is yellowish-red, red, or dark-red loam, clay loam, or silty clay loam. Sandstone fragments up to 3 feet in diameter make up 15 to 50 percent of the soil mass. The depth to sandstone, siltstone, or shale is 4 to 15 feet.

This soil is medium acid. It has low natural fertility. The available water capacity is moderate. The root zone is 4 feet or more thick.

This soil is not suited to cultivated crops. The sandstone fragments and steep slopes interfere with the operation of farm machinery. The soil is well suited to pasture grasses and is moderately well suited to upland oak, shortleaf pine, hickory, and black walnut. Runoff is rapid, and the erosion hazard is very severe. (Capability unit VIIe–1; woodland group 7; wildlife group 6; no range site classification)

maintain. The soils are moderately well suited to upland oak, hickory, black walnut, and shortleaf pine. Runoff is rapid, and the erosion hazard is very severe.

The somewhat excessively drained Hector soils and the well-drained Mountainburg soils occur as long, narrow

and mountaintops in the southern two-thirds of the county. Their slope range is 1 to 8 percent. Sandstone bedrock is at a depth of 2 to 4 feet.

Apison soils are associated with Linker, Captina, Johnsburg, Hector, Mountainburg, and Enders soils. They differ

upland oak, shortleaf pine, black walnut, and black locust. Most of the acreage has been cultivated, but now most of it is pasture or meadow and the rest is reverting to forest. Runoff is medium, and the erosion hazard is moderate. (Capability unit IIe–3; woodland group 5; wildlife group 3; no range site classification)

Apison loam, 3 to 8 percent slopes, eroded (ApC2).—This soil is on ridges and mountaintops. The areas are

lack the cherty fragipan that is typical of Nixa soils. They differ from Pembroke and Pickwick soils in being cherty throughout and having a finer textured subsoil.

Representative profile (Baxter cherty silt loam, 20 to 45 percent slopes, in a wooded area; SE¼NE¼SE¼ sec. 27, T. 18 N., R. 28 W.):

A1—0 to 1 inch, brown (10YR 5/3) cherty silt loam; moderate,

(Capability unit IIIe–3; woodland group 5; wildlife group 4; no range site classification)

Baxter cherty silt loam, 8 to 12 percent slopes (BqD).—

what lighter colored surface layer than Samba and Summit soils. They are more acid and coarser textured above the claypan than Summit soils.

Representative profile (Cherokee silt loam in an area of Cherokee complex, mounded, in a pasture; NW¼SE¼-SW¼ sec. 36, T. 16 N., R. 29 W.):

Ap—0 to 9 inches, dark-gray (10YR 4/1) silt loam; weak, fine, granular structure; friable; many roots; common, small, round, dark-colored concretions; common, yellowish-brown (10YR 5/6) splotches on peds; medium acid; clear, smooth boundary. 6 to 10 inches thick.

A2g—9 to 19 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, faint, brown mottles; weak, fine, subangular blocky structure; firm; slightly brittle; many, dark-colored, soft and hard concretions; medium acid; clear, wavy boundary. 5 to 15 inches thick.

B1g—19 to 24 inches, light-gray (10YR 6/1) silty clay loam; common, medium, prominent, yellowish-red mottles; moderate, medium, subangular and angular blocky structure; firm; few, thin, discontinuous clay films on ped faces; common tubular pores; strongly acid; clear, wavy boundary. 4 to 10 inches thick.

B21tg—24 to 48 inches, light-gray (10YR 6/1) clay; 10 percent prominent, yellowish-red mottles; weak, medium, prismatic structure that breaks to strong, medium, angular blocky structure; firm; plastic; few roots; common tubular pores; thick, continuous clay films on ped faces and pore walls; strongly acid; gradual, wavy boundary. 15 to 32 inches thick.

B22tg—48 to 61 inches, variegated, 60 percent light-gray (10YR 6/1) and 40 percent yellowish-brown (10YR 5/4, 5/6) meadow grasses, small grain, and row crops. Runoff is slow. Wetness is a very severe hazard. Erosion is a slight hazard in the more sloping areas. (Capability unit IVw–1; woodland group 8; wildlife group 5; no range site classification)

Cherokee complex, mounded (0 to 1 percent slopes) (Ck).—This complex is mainly on stream terraces. Most areas are between 10 and 50 acres in size. Rounded mounds make up 15 to 30 percent of each area. They are 40 to 100 feet in diameter, 1½ to 3 feet high, and 20 to 200 feet apart. The areas between the mounds are Cherokee soils. The mounds are unnamed soils. Included in mapping were small areas of Johnsburg, Summit, and Samba soils and spots where the subsoil is neutral.

The surface layer of the Cherokee soil is dark-gray or dark grayish-brown silt loam 12 to 24 inches thick. The subsoil is mottled gray, brown, and yellowish-brown, plastic silty clay or clay and is 4 to 7 feet thick. The depth to sandstone is 5 to 12 feet.

The surface layer of the unnamed soils is dark-brown or very dark grayish-brown silt loam 15 to 24 inches thick. The subsoil is strongly acid or medium acid. It extends to a depth of several feet. The upper part is brown or yellowish-brown silt loam, and the lower part is mottled gray and yellowish-brown clay or silty clay.

These soils are strongly acid. They have low natural fertility and respond moderately well to lime and fertil-

B21t—9 to 25 inches, variegated yellowish-brown (10YR 5/4) and pale-brown (10YR 6/3) cherty silt loam; weak, medium and fine, subangular blocky structure; ped shape determined by shape of interstices between chert fragments; friable; plentiful roots; many, medium, tubular and vesicular pores; few, thin, discontinuous clay films on pore walls; 80 percent angular chert up to 9 inches in diameter; strongly acid; gradual, wavy boundary. 8 to 26 inches thick.

B22t—25 to 32 inches, variegated strong-brown (7.5YR 5/6) and pale-brown (10YR 6/3) cherty silt loam; weak, medium and fine, subangular blocky structure; ped shape determined by shape of interstices between chert fragments; firm; few roots; many, medium, tubular and vesicular pores; few, thin, discontinuous clay films on pore walls; 80 percent angular chert up to 9 inches in diameter; strongly acid; abrupt, irregular boundary. 6 to 24 inches thick.

B3t—32 to 47 inches, chert bed; interstices filled with strong-brown (7.5YR 5/6) and pale-brown (10YR 6/3) silt loam.

The A1 horizon is very dark grayish brown (10YR 3/2) or very dark brown (10YR 2/2). The A2 horizon is grayish brown (10YR 5/2), brown (10YR 5/3), or dark grayish brown (10YR 4/2). Some pedons have a B1 horizon that is like the B21t except that it has a lower clay content. The B21t horizon is yellowish brown (10YR 5/4), brown (10YR 5/3), or pale brown (10YR 6/3) and is variegated in most places. The B22t horizon is yellowish brown (10YR 5/4, 5/6) or strong brown (7.5YR 5/6) and in most places is variegated with pale brown (10YR 6/3). The chert content in all horizons ranges from 50 to 90 percent. The depth to the B3t horizon ranges from 24 to 54 inches. In places the B3t horizon is lacking and there is a B23t horizon that is about 90 to 95 percent fractured chert and has red and dark-red clay or silty clay in the interstices. The reaction is slightly acid or medium acid in the A horizon and

sandstone, siltstone, and shale, and partly from limestone. The landscape is one of alternate short slopes and narrow depressions. The slope range is 0 to 3 percent.

Cleora soils are associated with Razort, Sloan, and Elsah soils. They differ from Razort soils mainly in lacking a B horizon. They are better drained and more sandy than Sloan soils and lack the gray mottles typical of those soils. They are much less gravelly than Elsah soils.

Representative profile (Cleora fine sandy loam in a pasture; SW¼SE¼NE¼ sec. 4, T. 15 N., R. 30 W.):

Ap—0 to 6 inches, dark-brown (10YR 3/3) fine sandy loam; massive; firm; abundant roots; slightly acid; clear, smooth boundary. 4 to 8 inches thick.

A1—6 to 13 inches, dark-brown (10YR 3/3) fine sandy loam; weak, medium, granular structure; friable; many roots and tubular pores; medium acid; gradual, smooth boundary. 6 to 16 inches thick.

C1—13 to 33 inches, dark-brown (10YR 3/3) fine sandy loam; weak, medium, granular structure; very friable; few roots; many tubular pores; lenses of structureless, loose, yellowish-brown (10YR 5/6) sand less than 1 inch thick; medium acid; abrupt, wavy boundary. 15 to 25 inches thick.

C2—33 to 45 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, medium, granular structure; very friable; few roots; many tubular pores; few, thin, discontinuous lenses of sand; medium acid; abrupt, wavy boundary. 10 to 20 inches thick.

C3—45 to 72 inches +, stratified, 75 percent yellowish-brown (10YR 5/4) and 25 percent dark-brown (10YR 3/3) loamy fine sand; structureless (single grain); loose; very few roots; medium acid.

wooded area; SE¼NW¼NW¼ sec. 3, T. 16 N., R. 30 W.):

A1—0 to 2 inches, dark-brown (10YR 3/3) stony loam; weak, medium, granular structure; very friable; abundant roots; 25 percent stones; medium acid; abrupt, smooth boundary. 1 to 3 inches thick.

A2—2 to 9 inches, brown (10YR 4/3) stony loam; weak, medium, granular structure; very friable; abundant roots; 25 percent sandstone; strongly acid; clear, wavy boundary. 3 to 9 inches thick.

B21t—9 to 22 inches, red (2.5YR 4/6) stony clay; strong, fine and medium, angular blocky structure; firm; plastic; few roots; medium, continuous clay films on peds; 15 percent sandstone; strongly acid; clear, wavy boundary. 6 to 18 inches thick.

B22t—22 to 32 inches, variegated clay; 60 percent dark red (2.5YR 3/6), 25 percent light brownish gray (10YR 6/2), and 15 percent yellowish brown (10YR 5/4); moderate, fine angular blocky structure; firm; plastic;

to pasture and meadow grasses and row crops. It is poorly suited to upland hardwoods, such as oak, elm, and hickory, and is moderately well suited to shortleaf pine. Most of the acreage has been cultivated, but now part of it is used for pasture or hay crops and the rest is reverting to hardwoods. Runoff is moderate, and the erosion hazard is very severe. (Capability unit IVe–5; woodland group 10; wildlife group 9; Claybreak Shale range site)

Enders gravelly loam, 3 to 8 percent slopes, eroded (EnC2).—This soil is mainly on mountain benches. Most areas are between 5 and 25 acres in size. Included in mapping were spots of Savannah, Allegheny, and Allen soils. Rills are common, and there are a few shallow gullies.

The surface layer is brown or grayish brown and is 4 to 9 inches thick. In spots the plow layer is a mixture of the original surface layer and material from the sub-

ping were spots of Savannah, Allen, and Allegheny soils. Rills are common, and there are a few shallow gullies.

The surface layer is brown or grayish brown and is 4 to 9 inches thick. In spots the plow layer is a mixture of the original surface layer and material from the subsoil. The subsoil is red or dark-red, plastic clay 36 to 80 inches thick. The lower part is mottled pale brown and gray. The gravel content is 20 to 60 percent in the surface layer and 0 to 15 percent in the subsoil.

This soil is very strongly acid. It has low natural fertility and responds moderately well to fertilizer and lime. The available water capacity is moderate. Permeability is very slow. The root zone is more than 3 feet thick, but root penetration is slow in the subsoil.

This soil is somewhat difficult to till because of the gravel content. It is moderately well suited to poorly suited to pasture and meadow grasses. It is poorly suited to upland hardwoods, such as oak, elm, and hickory, and is moderately well suited to shortleaf pine. Most of the acreage has been cleared, and part has been cultivated. Now, part of it is used for pasture or hay crops and the rest is reverting to hardwoods. Runoff is rapid, and the erosion hazard is severe. (Capability unit VIe–4; woodland group 10; wildlife group 9; Claybreak Shale range site)

Enders stony loam, 3 to 12 percent slopes (EoD).—This soil is mainly on ridgetops. Most areas are between 10 and 75 acres in size.

The surface layer is brown or grayish brown and is 5 to 10 inches thick. The subsoil is red or dark-red, plastic clay 36 to 70 inches thick. The lower part is mottled pale brown and gray. The sandstone content is 20 to 60 percent in the surface layer and 0 to 15 percent in the subsoil. The depth to shale is 3½ to 7 feet.

This soil is very strongly acid. It has low natural fertility and shows poor response to fertilizer and lime. The available water capacity is moderate. Permeability is very slow. The root zone is more than 3 feet thick, but root penetration is slow in the subsoil.

This soil is difficult to till because stones interfere with the operation of farm machinery. The soil is moderately well suited to poorly suited to pasture crops. It is poorly suited to upland hardwoods, such as oak, elm, and hickory, and is moderately well suited to shortleaf pine. Most of the acreage is either pasture or woodland consisting of poor-quality hardwoods. Runoff is rapid, and the erosion hazard is severe. (Capability unit VIs–1; woodland group 10; wildlife group 9; Claybreak Shale range site)

Enders-Allegheny complex, 2 to 20 percent slopes

a surface layer of dark-brown stony loam 7 to 14 inches thick. Their subsoil extends to a depth of 25 to 50 inches. The upper part is yellowish-brown or strong-brown stony clay loam, and the lower part is mottled red and gray, plastic clay. The reaction is strongly acid, natural fertility is low, and the available water capacity is moderate. The root zone is 3 feet or more thick. These soils are moderately well suited to upland oak, black walnut, shortleaf pine, and black locust.

Stones and steep slopes make the operation of farm machinery difficult. Small acreages have been cleared, and a few have been cultivated. Now most of the acreage is cutover woodland, dominantly hardwoods. Most of the cleared acreage is used for pasture or is idle. Runoff is rapid, and the erosion hazard is very severe. (Because of inaccessible location, this complex was surveyed at lower intensity than most of the county. Differences between the soils of this complex justify placing them in different interpretative groups. Enders soils: capability unit VIIs–4; woodland group 10; wildlife group 9; Claybreak Shale range site. Allegheny soils: capability unit VIIe–1; woodland group 7; wildlife group 9; no range site classification)

Enders-Allegheny complex, 20 to 40 percent slopes (ErF).—This complex is on mountainsides. It is 60 percent Enders soils and about 40 percent Allegheny soils. Included in mapping were spots of Allen, Montevallo, Hector, Mountainburg, and Savannah soils, and outcrops and ledges of sandstone. The areas are between 40 and 600 acres in size.

The moderately well drained Enders soils have a surface layer of brown or grayish-brown stony loam 5 to 10 inches thick, and a subsoil of mottled red and gray, plastic clay 36 to 70 inches thick. The reaction is strongly acid, natural fertility is low, and the available water capacity is moderate. The root zone is more than 3 feet thick, but root penetration is slow in the subsoil. These soils are poorly suited to upland hardwoods, such as oak, elm, and hickory, and are moderately well suited to shortleaf pine.

The well-drained Allegheny soils have a surface layer of dark-brown stony loam 7 to 14 inches thick. Their subsoil extends to a depth of 25 to 50 inches. The upper part is yellowish-brown or strong-brown stony clay loam, and the lower part is mottled red and gray, plastic clay. The reaction is strongly acid, natural fertility is low, and the available water capacity is moderate. The root zone is 3

Fayetteville Series

The Fayetteville series consists of deep, well-drained, moderately permeable, red soils that developed in residuum derived from massive, soft, calcareous sandstone. [illegible]

are between 10 and 100 acres in size. There are a few rills and shallow gullies.

The surface layer is dark reddish brown or dark brown and is 6 to 10 inches thick. In spots the plow layer is a mixture of the original surface layer and material from

Fayetteville stony fine sandy loam, 12 to 35 percent slopes (FeF).—This soil is mainly on hillsides. Most areas are between 10 and 60 acres in size. Included in mapping were spots of Allen and Hector soils and outcrops of sandstone and limestone.

The surface layer is dark reddish brown or dark brown and is 6 to 10 inches thick. The subsoil is dark reddish-brown, dark-red, or dusky-red, friable stony loam, stony sandy clay loam, or stony clay loam. It is 30 to 55 inches thick. The depth to bedrock is 3 to 6 feet.

This soil is slightly acid. It has moderate natural fertility and responds well to fertilizer and moderately well to lime. The organic-matter content is low. The available water capacity is moderate. Roots and moisture easily penetrate to a depth of 3 feet or more.

This soil is easy to keep in good tilth. Because of the slope and the stone content, it is not suited to row crops. It is well suited to upland oak, hickory, black walnut, and black locust. Runoff is rapid, and the erosion hazard is very severe. (Capability unit VIIe–1; woodland group 4; wildlife group 6; no range site classification)

Fayetteville-Hector complex, 20 to 40 percent slopes (FhF).—This complex is on mountainsides, mainly in the southwestern part of the county. It is 35 percent Fayetteville soils and 65 percent Hector and Mountainburg soils. Included in mapping were outcrops of sandstone and limestone and spots of Linker, Allen, and Allegheny soils.

The well-drained Fayetteville soils have a surface layer of dark-brown or dark reddish-brown stony fine sandy loam that is 6 to 10 inches thick and a subsoil of dark reddish-brown or dark-red stony loam or stony sandy clay loam that is 30 to 50 inches thick. The reaction is medium 6; no range site classification. Hector and Mountainburg soils: capability unit VIIs-2; woodland group 10; wildlife group 6; Sandstone Ridge range site)

Guin Series

The Guin series consists of well-drained, moderately rapidly permeable, cherty soils on fans and foot slopes. These soils developed in colluvium derived from cherty limestone. The slope range is 3 to 8 percent.

Guin soils are associated with Baxter, Clarksville, and Pembroke soils. They are more cherty throughout and have a much less clayey subsoil than Baxter soils. Also, their subsoil is brown instead of red. They are less cherty and are deeper over bedrock than Clarksville soils. They are much less red in the subsoil and are more cherty and less clayey in the surface layer and subsoil than Pembroke soils.

Representative profile (Guin cherty silt loam, 3 to 8 percent slopes, in a pasture; SW¼SW¼NW¼ sec. 8, T. 14 N., R. 33 W.):

Ap—0 to 5 inches, dark-brown (10YR 3/3) cherty silt loam; weak, medium, granular structure; very friable; about 50 percent chert; medium acid; clear, wavy boundary. 5 to 8 inches thick.

A2—5 to 10 inches, brown (10YR 4/3) cherty silt loam; weak, fine, subangular blocky structure; very friable; about 50 percent chert; medium acid; gradual, wavy boundary. 3 to 8 inches thick.

B1—10 to 15 inches, brown (10YR 4/3) cherty silt loam; weak, fine, subangular blocky structure; friable; about 60 percent chert; medium acid; gradual, wavy boundary. 4 to 10 inches thick.

B2—15 to 52 inches +, yellowish-brown (10YR 5/4) cherty silt loam; weak, medium, subangular blocky structure;

seepage water. Runoff is slow. Droughtiness is a severe limitation. (Capability unit IVs–2; woodland group 6; wildlife group 4; no range site classification)

Hector Series

The Hector series consists of shallow, somewhat excessively drained soils that developed in material weathered from acid sandstone and siltstone. These soils occupy narrow ridges, edges of broad mountaintops, steep mountainsides, and narrow bluffs between mountainside benches. The slope range is 3 to 40 percent.

These soils occur as small areas intermingled with Mountainburg, Allen, and Fayetteville soils and are mapped as complexes with these soils. They are also associated with Linker, Apison, Allegheny, and Enders soils. They contain more coarse fragments than Mountainburg soils and have a thinner, coarser textured subsoil that is yellowish brown instead of brown to yellowish red. They are much shallower over bedrock and have a thinner, much less capacity is low because of shallowness and the high gravel content. The root zone is less than 20 inches thick.

These soils are difficult to till because of the gravel content. They are poorly suited to row crops and are only poorly suited to moderately well suited to hay and pasture crops. They are also poorly suited to trees. Most of the acreage is pasture or meadow. Part of it is forest or is reverting to forest. Runoff is medium, and the erosion hazard is very severe. (Capability unit IVe–4; woodland group 10; wildlife group 7; Sandstone Ridge range site)

Hector-Mountainburg gravelly fine sandy loams, 8 to 12 percent slopes (HmD).—This complex consists of about equal proportions of Hector and Mountainburg soils. It is in the Boston Mountains, on long narrow ridges or near the edges of broad mountaintops. Included in mapping were stony spots and rock outcrops and small areas of Linker soils.

The surface layer of the somewhat excessively drained Hector soils is brown and is about 6 inches thick. The subsoil is yellowish brown or strong brown gravelly fine

Jay Series

The Jay series consists of well-drained, slowly permeable soils that have a fragipan. These soils developed mainly in silty material under tall grasses. The slope range is 1 to 8 percent.

Jay soils are associated with Summit, Cherokee, Captina, Sogn, and Taloka soils. They have a thicker, darker colored surface layer than Captina soils. They are better drained and have a less clayey subsoil than Cherokee soils. They are browner, better drained, and coarser textured than Taloka and Summit soils, and they have a fragipan instead of a claypan. They have a thicker solum than Sogn soils.

Representative profile (Jay silt loam, 3 to 8 percent slopes, in a meadow; NW¼NE¼NW¼ sec. 36, T. 16 N., R. 32 W.):

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; abundant roots; few, fine, hard and soft, dark-colored concretions; medium acid; abrupt, smooth boundary.

A1—9 to 16 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, subangular blocky structure; very friable; abundant roots; common fine pores; few, fine, hard and soft concretions; strongly acid; gradual, smooth boundary. A horizon 10 to 18 inches thick.

B2t—16 to 25 inches, yellowish-brown (10YR 5/6) silty clay

Jay silt loam, 1 to 3 percent slopes (JaB).—This soil is on broad uplands. The areas are between 10 and 100 acres in size. Included in mapping were spots of Captina and Pickwick soils.

The surface layer is dark brown, very dark brown, or very dark grayish brown and is 10 to 18 inches thick. The upper part of the subsoil is yellowish-brown or strong-brown silt loam or silty clay loam that is 6 to 17 inches thick. The lower part is a firm, brittle fragipan 35 to 60 inches thick. The pan is silt loam or silty clay loam and is mottled with yellowish brown, grayish brown, light gray, and yellowish red.

This soil is medium acid or strongly acid. It has moderate natural fertility and responds well to lime and fertilizer. The available water capacity is moderate. Water and roots penetrate the upper part of the subsoil readily but move slowly into the fragipan.

This soil is well suited to hay and pasture crops, small grain, and corn. Runoff is medium, and the erosion hazard is moderate. (Capability unit IIe–1; woodland group 13; wildlife group 2; Loamy Prairie range site)

Jay silt loam, 3 to 8 percent slopes (JaC).—This soil is on broad uplands. The areas are between 10 and 100 acres in size. Included in mapping were spots of Captina and Pickwick soils and areas where the surface layer is brown or yellowish brown.

Representative profile (Johnsburg silt loam in a pasture; SW¼SE¼SW¼ sec. 4, T. 15 N., R. 32 W.):

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; very friable; few, fine, dark-colored concretions; many roots; medium acid; abrupt, smooth boundary. 6 to 10 inches thick.

B1—8 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct, strong-brown mottles; weak, medium, subangular blocky structure; friable; few krotovinas up to 3 inches in diameter filled with

This soil is moderately well suited to well suited to row crops, small grain, hay crops, and pasture grasses. Wetness is a severe hazard. Surface drainage is needed if row crops are to be grown. Runoff is slow. There is a slight hazard of erosion on the more sloping areas. (Capability unit IIIw–2; woodland group 8; wildlife group 5; no range site classification)

Johnsburg complex, mounded (0 to 1 percent slopes) (Js).—This complex is mainly on stream terraces. Most areas

B21tg—12 to 17 inches, light-gray (10YR 6/1) silty clay loam; many, medium, distinct, dark yellowish-brown mottles and few, medium, distinct, dark-brown mottles; moderate, medium, subangular blocky structure; firm; few roots; common, fine and medium pores; common, thin, discontinuous clay films; very strongly acid; abrupt, smooth boundary. 4 to 12 inches thick.

B22tg—17 to 50 inches, dark-gray (10YR 4/1) silty clay; many, medium, distinct, dark yellowish-brown mottles; moderate, coarse, angular blocky structure; very firm; plastic; few roots; few pores; common, thin, discontinuous clay films on ped surfaces; very strongly acid; gradual, smooth boundary. 20 to 40 inches thick.

C—50 to 72 inches +, clay; about 60 percent light gray (10YR 6/1), 25 percent grayish brown (10YR 5/2), and 15 percent dark gray (10YR 4/1); massive; very firm; few roots; few pores; very strongly acid. 15 to 30 inches thick.

subsoil is mottled light-gray and dark yellowish-brown silty clay or clay that is 36 to 60 inches thick. The depth to sandstone or cherty limestone is 56 to 96 inches.

The surface layer of the unnamed soils is dark-brown or very dark grayish-brown silt loam that is 15 to 24 inches thick. The subsoil is 25 to 40 inches thick. The upper part is brown or grayish-brown silt loam, and the lower part is mottled gray and yellowish-brown clay or silty clay.

The soils in this complex are strongly acid. They have low natural fertility and respond moderately well to lime and fertilizer. The organic-matter content is low. The available water capacity is moderate. The root zone is 3 feet or more in thickness.

These soils are moderately well suited to row crops and small grain and are moderately well suited to well suited to

(10YR 4/3, 5/3) or dark grayish brown (10YR 4/2). In spots crops. It is also moderately well suited to upland oak,

meadow, part is idle, and the rest is planted to shortleaf pine. Runoff is medium, and the erosion hazard is severe. (Capability unit IIIe–4; woodland group 5; wildlife group 3; no range site classification)

Linker gravelly loam, 3 to 8 percent slopes, eroded (lnC2).—This soil is mainly on ridges and mountaintops. The areas are between 10 and 30 acres in size. Included in and are finer textured than Mountainburg and Hector soils. They are more acid, are coarser textured, and have lower base saturation than Sogn soils.

Representative profile (Montevallo stony loam in a wooded area of Montevallo soils, 3 to 12 percent slopes; NW¼SE¼NE¼ sec. 3, T. 15 N., R. 31 W.) :

O1—1 inch to 0, hardwood leaves and twigs.

The soil is medium acid. The subsoil is very low in natural **Nixa Series**

slowly permeable fragipan. The depth to the pan is 14 to 24 inches.

This soil is [illegible]

B1—5 to 13 inches, dark reddish-brown (5YR 3/4) silt loam; weak, medium, subangular blocky structure; friable; common, fine pores; few chert fragments; medium

than Fayetteville soils and are less cherty and less clayey than Baxter soils.

Representative profile (Pickwick silt loam, 1 to 3 percent slopes, in a pasture; SE¼SW¼NW¼ sec. 18, T. 17 N., R. 29 W.):

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; very friable; plentiful roots; few, dark-colored, hard concretions; medium acid; abrupt, smooth boundary. 4 to 10 inches thick.

B1—8 to 15 inches, yellowish-red (5YR 5/6) silt loam; moderate, fine, subangular blocky structure; friable; plentiful roots; few, small, dark-colored concretions; few worm casts; medium acid; clear, wavy boundary. 4 to 10 inches thick.

B21t—15 to 24 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, fine, subangular blocky structure; friable; few roots; common tubular pores; thin, discontinuous clay films on ped faces and pore walls; strongly acid; clear, irregular boundary. 6 to 20 inches thick.

B22t—24 to 64 inches, variegated yellowish-red (5YR 4/6), dark-red (2.5YR 3/6), and light brownish-gray (10YR 6/2) silty clay loam; moderate, medium, angular and subangular blocky structure; firm; slightly brittle; few roots; common, continuous clay films on ped faces; clay plugs in some pores and thick clay films on pore walls; isolated coarse peds about 2 inches in diameter and 5 inches thick contain concentrations of black concretions and have dark-brown and black ped coatings; lowermost 6 inches contains many, dark-colored, hard concretions and is 5 percent subrounded chert and siltstone pebbles; strongly acid. 22 to 48 inches thick.

R—64 inches +, chert bedrock.

The Ap horizon is brown (10YR 4/3), reddish-brown (YR 4/4), or dark-brown (7.5YR 4/4) silt loam or gravelly loam. The B1 horizon is yellowish-red (5YR 5/6) or strong-brown (7.5YR 5/6) silt loam, gravelly silt loam, or silty clay loam. The B2t horizon is clay loam, silty clay loam, or gravelly clay loam. The B21t horizon is yellowish red (5YR 4/6) or red (2.5YR 4/6). The B22t horizon is variegated with yellowish red (5YR 4/6), dark red (2.5YR 3/6), light brownish gray (10YR 6/2), and gray (10YR 6/1). In places the B22t horizon is red and is not variegated. In places bedrock is overlain with strata of rounded gravel. The depth to bedrock ranges from 3 to more than 7 feet. The reaction is slightly acid or medium acid in the Ap horizon and medium acid or strongly acid in the B horizon.

Pickwick gravelly loam, 3 to 8 percent slopes, eroded (PkC2).—Areas of this soil are between 7 and 20 acres in size. Small areas of Savannah soils were included in mapping.

with the surface layer and there is a reddish-brown plow layer. The subsoil is yellowish-red or red clay loam or gravelly clay loam 28 to 40 inches thick. Most areas have a few rills and shallow gullies.

This soil is medium acid. It has moderate natural fertility and responds well to lime and fertilizer. The available water capacity is high. The root zone is 3 feet or more in thickness.

This soil is well suited to small grain and to hay and pasture crops. Runoff is rapid, and the erosion hazard is very severe. (Capability unit IVe–1; woodland group 3; wildlife group 3; no range site classification)

Pickwick silt loam, 1 to 3 percent slopes (PsB).—Areas of this soil are between 10 and 30 acres in size. Spots of Captina and Savannah soils were included in mapping.

The surface layer is brown or dark brown and is 6 to 10 inches thick. The subsoil is yellowish-red to dark-red silty clay loam that is 30 to 60 inches thick. In most places the lower part of the subsoil is mottled yellowish red, dark red, light brownish gray, and gray.

This soil is medium acid. It has moderate natural fertility and responds well to lime and fertilizer. The available water capacity is high. The root zone is 3 feet or more in thickness.

This soil is well suited to corn, small grain, hay and pasture crops, and orchards and vineyards. Runoff is medium, and the erosion hazard is moderate. (Capability unit IIe–2; woodland group 3; wildlife group 3; no range site classification)

Pickwick silt loam, 3 to 8 percent slopes, eroded (PsC2).—Areas of this soil are between 20 and 100 acres in size. A few spots of Nixa, Savannah, and Captina soils were included in mapping.

The surface layer is brown or dark brown and is 4 to 8 inches thick. In spots subsoil material has been mixed with the surface layer and there is a reddish-brown plow layer. The subsoil is yellowish-red to dark-red clay loam or silty clay loam that is 25 to 55 inches thick. In most places the lower part of the subsoil is mottled yellowish red, dark red, light brownish gray, and gray. There are a few rills and shallow gullies in most areas.

This soil is medium acid. It has moderate natural fertil-

Representative profile (Razort silt loam, occasionally flooded, in a pasture; SE¼NE¼SE¼ sec. 33, T. 17 N., R. 31 W.):

Ap—0 to 8 inches, dark yellowish-brown (10YR 3/4) silt loam; moderate, medium, granular structure; very friable; abundant roots; neutral; gradual, smooth boundary. 7 to 15 inches thick.

B1—8 to 19 inches, dark-brown (10YR 3/3) silt loam; weak, coarse, subangular blocky structure; friable; common roots; many, fine and medium, tubular pores; many worm casts; slightly acid; gradual, smooth boundary. 6 to 13 inches thick.

B21t—19 to 24 inches, brown (10YR 4/3) and dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; common roots; many, fine and medium, tubular pores coated with clay films; many worm casts; medium acid; gradual, smooth boundary. 4 to 10 inches thick.

B22t—24 to 33 inches, dark-brown (10YR 3/3) and dark yellowish-brown (10YR 4/4) silt loam; weak, medium and coarse, subangular blocky structure; friable; few roots; common, fine and medium, tubular pores; thin, discontinuous clay films on ped surfaces; medium acid; gradual, wavy boundary. 7 to 14 inches thick.

B23t—33 to 54 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium and coarse, subangular blocky structure; friable; few roots; common, fine and medium, tubular pores; brown, thin, discontinuous clay films on ped surfaces; medium acid; gradual, wavy boundary. 14 to 24 inches thick.

C—54 to 72 inches +, variegated strong-brown (7.5YR 5/6), brown (10YR 5/3), and gray (10YR 5/1) silt loam; massive; friable; few roots; 75 percent chert fragments; common, medium, tubular pores; medium acid; 10 to 30 inches thick.

The A horizon is silt loam, loam, or gravelly silt loam. It is dark yellowish brown (10YR 3/4), very dark brown (10YR 2/2), or dark brown (10YR 3/3). The B1 horizon is dark brown (10YR 3/3) or dark yellowish brown (10YR 3/4). The

Razort gravelly silt loam, occasionally flooded (0 to 2 percent slopes) (Rg).—This soil occurs as long narrow areas parallel to stream channels. The areas are between 10 and 25 acres in size. Included in mapping were small areas of Elsah soils and nongravelly spots.

The surface layer is dark brown, dark yellowish brown, or very dark brown and is 7 to 15 inches thick. The subsoil is dark-brown, brown, or dark yellowish-brown gravelly silt loam 2 to 4 feet thick. In places it has gray mottles below a depth of 36 inches. The underlying material commonly has layers of chert gravel 6 to 18 inches thick. Chert gravel makes up 15 to 40 percent of the soil mass. The depth to bedrock ranges from 5 to more than 12 feet .

This soil is slightly acid. It has medium natural fertility and responds well to fertilizer. The available water capacity is moderate. The root zone is 5 feet or more in thickness. Roots and moisture penetrate easily.

This soil is well suited to hay and pasture crops, small grain, corn, and truck crops. It is suited to sprinkler irrigation. Runoff is slow. The overflow hazard is moderate. (Capability unit IIw–1; woodland group 1; wildlife group 1; no range site classification)

Razort loam (0 to 2 percent slopes) (Rk).—Most areas of this soil are between 5 and 60 acres in size. Included in mapping were small areas of Cleora and Elsah soils and gravelly spots.

The surface layer is dark yellowish brown or dark brown and is 7 to 12 inches thick. The subsoil is dark yellowish-brown or dark-brown loam, silt loam, or clay loam that is 45 to 70 inches thick. The depth to bedrock is 5 to more than 12 feet.

This soil is slightly acid. It has medium natural fertility and responds well to lime and fertilizer. The available

B2t—11 to 22 inches, strong-brown (7.5YR 5/6) loam; moderate, medium, subangular blocky structure; friable; common, thin, continuous clay films in pores and on ped faces; small amount of sandstone gravel; strongly acid; clear, wavy boundary. 8 to 18 inches thick.

Bx1—22 to 29 inches, variegated light brownish-gray (10YR 6/2), yellowish-red (5YR 4/6), and light yellowish-brown (10YR 6/4) loam; moderate, medium, subangular blocky structure; firm; brittle; common vesicular pores; common, thin clay films on ped faces;

and material from the subsoil and is yellowish brown. The upper part of the subsoil is strong-brown or yellowish-brown loam or clay loam that is 8 to 16 inches thick. The lower part is a compact, brittle fragipan. The pan is loam or clay loam in texture and is mottled with light brownish gray, yellowish brown, and red. The depth to bedrock is more than 5 feet. There are a few rills and shallow gullies.

Sloan silt loam (0 to 3 percent slopes) (Sn).—This soil occurs as long, narrow, mostly undulating areas parallel to streams. Most areas are between 5 and 50 acres in size. Included in mapping were small areas of Razort and Cleora soils and spots where the surface layer is more than 20 inches thick.

The surface layer is brown or very dark grayish brown and is 10 to 20 inches thick. The underlying material is mottled dark-gray and yellowish-brown silt loam or loam.

This soil is slightly acid. It has moderate natural fertility and responds well to lime and fertilizer. The available water capacity is moderate. The root zone is more

crossed with tractors and mowing machines. Most of the acreage is either native pasture or idle land. (Capability unit VIIs–3; woodland group 12; wildlife group 8; Limestone Ledge range site)

Summit Series

The Summit series consists of moderately well drained, very slowly permeable soils that developed in residuum or old alluvium derived from calcareous shale and limestone.

Summit soils are associated with Enders, Cherokee, Soon, Jay, Samba, Johnsburg, and Taloka soils. They are

The surface layer of the Summit soils is black or very dark grayish-brown, sticky silty clay that is 10 to 20 inches thick. The subsoil is mottled dark grayish-brown, light olive-brown, and dark-gray, plastic clay or silty clay that is several feet thick.

10 and 40 acres in size. Included in mapping were stony spots and spots where the surface layer is silt loam.

The surface layer is black or very dark gray, sticky, and 10 to 16 inches thick. The subsoil is mottled light olive-brown, strong-brown, and dark-gray, plastic clay that is 3

Summit stony silty clay, 12 to 25 percent slopes, eroded (StE2).—This soil is on foot slopes and mountainsides. The areas are between 20 and 50 acres in size. Included in mapping were small areas of Enders soils and spots where the surface layer is stony silt loam.

The surface layer is black or very dark gray, sticky, and 10 to 15 inches thick. The subsoil is mottled light olive-brittle; common, medium, dark-colored concretions; medium acid; clear, wavy boundary. 2 to 6 inches thick.

A22g—16 to 23 inches, grayish-brown (10YR 5/2) silt loam; common, fine, distinct, yellowish-brown mottles; moderate, medium, subangular blocky structure; firm; slightly brittle; common, fine to coarse, dark concretions; common vesicular and tubular pores; medium acid: clear. smooth boundary. 4 to 12 inches thick,

Capability Groups of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops or to rice and other crops that have special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all the soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I. Soils have few limitations that restrict their use. (No class I soils in Washington County.)

Class II. Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils have severe limitations that reduce the [illegible] have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding Arabic numerals to the subclass symbol, for example, IIe–1 or IIIw–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit.

In the following pages each of the capability units in Washington County is described, and suggestions for use and management are given. The names of soil series represented are mentioned in the description of each unit, but this does not mean that all the soils of a given series are in the unit. The capability unit designation for each soil in the county can be found in the "Guide to Mapping Units."

Capability unit IIe–1

This unit consists of soils of the Captina, Jay, and Savannah series. These are deep, moderately well drained and [illegible]

These soils are well suited to corn, oats, wheat, barley, rye, sericea lespedeza, white clover, vetch, annual lespedeza, bermudagrass, fescue, orchardgrass, smooth bromegrass, and ryegrass. They are also well suited to peaches, apples, grapes, strawberries, brambleberries, tomatoes, and green beans and other truck crops.

Runoff is medium, and the erosion hazard is moderate. If adequate fertilization and proper tillage are practiced, cultivated crops that leave large amounts of residue can be grown year after year. No special management is needed if sown crops are grown year after year.

Capability unit IIe–3

This unit consists of soils of the Apison and Linker series, which are moderately deep, well-drained soils on uplands. The slope range is 1 to 3 percent. The surface layer is friable loam. The subsoil is firm loam to clay loam. The depth to bedrock is 30 to 48 inches.

Fertility is low, and the response to lime and fertilizer is good. The organic-matter content is low. The reaction is strongly acid. The available water capacity is moderate. Permeability is moderate.

These soils are suited to corn, sorghum, wheat, oats, rye, bermudagrass, johnsongrass, tall fescue, orchardgrass, [illegible] annual lespedeza, sericea lespedeza, and

Natural fertility is moderate, and the response to fertilizer is good. The organic-matter content is moderate. The reaction is slightly acid. The available water capacity is moderate to high. Permeability is moderate.

These soils are suited to corn, grain sorghum, oats, wheat, barley, rye, bermudagrass, johnsongrass, orchardgrass, tall fescue, smooth bromegrass, and ryegrass. They are well suited to annual lespedeza, alfalfa, red clover, white clover, sericea lespedeza, and vetch.

Runoff is slow. Overflow is a moderate hazard and occasionally damages crops. If adequate fertilization and proper tillage are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Cross-slope farming is desirable in sloping areas that are under intensive use.

Capability unit IIIe–1

This unit consists of soils of the Captina, Jay, and Savannah series. These are moderately well drained and well drained soils on uplands and stream terraces. The slope range is 3 to 8 percent. The surface layer is friable silt loam. The upper part of the subsoil is firm silt loam to clay loam. At a depth of 16 to 30 inches is a compact, brittle fragipan.

[illegible]

Capability unit IIIe-3 the use of grasses and legumes in the cropping system.

Capability unit IIIw–4

This unit consists of soils of the Summit series, which are deep soils on uplands and stream terraces. Most areas are level. Low, dome-shaped mounds make up about 15 to 30 percent of a few areas. The surface layer is sticky silty clay or silty clay loam. The subsoil is sticky, plastic clay.

Natural fertility is high, and the response to fertilizer is moderate. The organic-matter content is medium. The reaction is slightly acid. Permeability is very slow because of the high clay content. The available water capacity is

casionally if contour stripcropping is practiced and the cropping system includes grasses and legumes. Runoff is medium to rapid, and the erosion hazard is very severe.

Capability unit IVe–2

The one soil in this unit is Baxter cherty silt loam, 8 to 12 percent slopes. This is a deep, well-drained soil on uplands. Its surface layer is friable. Its subsoil is firm cherty silty clay or cherty clay.

Natural fertility is low, and the response to lime and fertilizer is moderate. The organic-matter content is low.

Capability unit IVe-5

This unit consists of soils of the Enders series. These are deep, moderately well drained, gravelly soils on uplands. The slope range is 3 to 8 percent. The surface layer is friable gravelly loam. The subsoil is plastic clay.

Natural fertility is low, and the response to lime and fertilizer is moderate. The organic-matter content is low. The reaction is very strongly acid. The available water capacity is moderate. Permeability is very slow because of the plastic clay subsoil, which restricts percolation of water and growth of roots.

These soils are poorly suited to row crops. They are moderately well suited to small grain and are well suited to annual lespedeza, sericea lespedeza, bermudagrass, and tall fescue.

These soils can be used as permanent pasture, range, or woodland. If terracing and contour cultivation are practiced, they can be used in a cropping system consisting of row crops, grasses, and legumes. Runoff is rapid, and the erosion hazard is very severe.

Capability unit IVs-1

The one soil in this unit in Nixa cherty silt loam, 8 to 12 percent slopes. This is a deep, moderately well drained soil on uplands. The upper part of its subsoil is cherty silt loam. At a depth of 14 to 22 inches is a compact, cherty fragipan.

Natural fertility is low, and the response to lime and fertilizer is poor to moderate. The organic-matter content is low. The reaction is medium acid. The available water capacity is low because of the chert content. Permeability is very slow because of the fragipan, which restricts movement of water and roots.

This soil is poorly suited to most crops. It is poorly suited to moderately well suited to small grain. It is moderately well suited to sericea lespedeza, annual lespedeza, bermudagrass, and fescue.

This soil can be used as permanent pasture, range, or woodland. Also, it can be used for small grain occasionally if contour cultivation or cross-slope farming is practiced and the cropping system includes grasses and legumes. The available water capacity, the shallow root zone, and difficulty in tillage are very severe limitations. Runoff is

cultivated crops. Runoff is slow. A severe overflow hazard is the chief limitation.

is very strongly acid. The available water capacity is moderate. Permeability is very slow because of the plastic clay

layer and the subsoil are cherty silt loam.

Natural fertility is low, and the response to lime and fertilizer is poor. The organic-matter content is low. The reaction is medium acid or strongly acid. The available water capacity is low because of the high chert content. Permeability is moderately rapid.

This soil can be used as pasture, range, woodland, or wildlife habitat. It is suited to bermudagrass, sericea lespedeza, and annual lespedeza. It is not suited to cultivated crops. Droughtiness is a very severe limitation.

Capability unit VIIs-2

This unit consists of soils of the Hector, Mountainburg,

tained from farmers and those who work with farmers.

The "A" columns in table 2 show the yields that can be expected under average management. Under such management, crops are not rotated according to a definite plan, the amounts and kinds of commercial fertilizer needed are not determined by soil tests, and little is done to control erosion or provide adequate drainage.

The "B" columns show the yields that can be expected under improved management. Improved management includes such practices as (1) returning crop residue to the soil; (2) applying fertilizer in amounts determined by soil tests and on the basis of past experience; (3) choosing well-

TABLE 2.—*Predicted average yields per acre of principal crops under two levels of management*

Figures in columns A indicate yields under average management; figures in columns B indicate yields under improved management. Absence of figure indicates the crop is not suited to or is not commonly grown on the soil specified]

Soil	Corn		Oats		Green beans		Grapes		Apples		Alfalfa		Pasture			
													Fescue		Hybrid bermudagrass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]
Allegheny gravelly loam, 3 to 8 percent slopes	30	50	30	55			3	5	300	400			5	7	5	7
Allegheny gravelly loam, 3 to 8 percent slopes, eroded	28	48	28	52			3	5	300	400			5	7	5	7
Allegheny gravelly loam, 8 to 12 percent slopes, eroded													4	6	4	6
Allegheny stony loam, 8 to 12 percent slopes													3	4	3	4
Allegheny stony loam, 12 to 40 percent slopes													2	4	3	4
Allen loam, 3 to 8 percent slopes, eroded	32	52	32	57			4	6	350	450			5	7	5	7
Allen loam, 8 to 12 percent slopes, eroded													4	6	4	6
Allen loam, 12 to 20 percent slopes, eroded													4	6	3	5
Allen soils, 8 to 20 percent slopes													3	4	3	5
Allen stony loam, 12 to 35 percent slopes													3	4	3	4
Allen-Hector complex, 20 to 40 percent slopes:																
Allen soils													3	4	3	4
Hector-Mountainburg soils													2	3		
Allen-Hector complex, 40 to 55 percent slopes:																
Allen soils													3	4	3	4
Hector-Mountainburg soils													2	3		
Apison loam, 1 to 3 percent slopes	30	50	30	55	3	4	3	5	400	500			5	7	6	8
Apison loam, 3 to 8 percent slopes, eroded	28	48	25	50	1. 5	2. 5	3	5	350	450			5	7	5	7
Apison gravelly loam, 3 to 8 percent slopes, eroded	22	42	20	45			2	4	300	400			4	6	4	6
Baxter cherty silt loam, 3 to 8 percent slopes	30	55	30	58			3	5	350	450	1. 5	2. 3	5	7	5	7
Baxter cherty silt loam, 8 to 12 percent slopes													4	6	4	6
Baxter cherty silt loam, 12 to 20 percent slopes													4	6	3	5
Baxter cherty silt loam, 20 to 45 percent slopes													4	6	3	5
Captina silt loam, 1 to 3 percent slopes	35	65	35	65	3	4	4	6	400	500			6	8	6	8

TABLE 2.—*Predicted average yields per acre of principal crops under two levels of management*—Continued

Soil	Corn		Oats		Green beans		Grapes		Apples		Alfalfa		Pasture			
													Fescue		Hybrid bermudagrass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Tons*	*Tons*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]
Enders-Allegheny complex, 8 to 20 percent slopes:																
Enders soils													2	4	3	4
Allegheny soils													3	5	3	5
Enders-Allegheny complex, 20 to 40 percent slopes:																
Enders soils													2	3	3	4
Allegheny soils													3	5	3	5
Fayetteville fine sandy loam, 3 to 8 percent slopes, eroded	30	60	30	65	2	3	4	6	450	550	2.0	3.0	5	8	7	9
Fayetteville fine sandy loam, 8 to 12 percent slopes, eroded									350	450			4	7	6	8
Fayetteville fine sandy loam, 12 to 20 percent slopes, eroded													3	4	5	7
Fayetteville stony fine sandy loam, 12 to 35 percent slopes													3	4	4	5
Fayetteville-Hector complex, 20 to 40 percent slopes:																
Fayetteville soils													3	4	4	5
Hector-Mountainburg soils													2	3		
Guin cherty silt loam, 3 to 8 percent slopes	25	50	25	50									5	7	5	7
Hector-Mountainburg gravelly fine sandy loams, 3 to 8 percent slopes													3	5	3	5
Hector-Mountainburg gravelly fine sandy loams, 8 to 12 percent slopes													2	4	3	4
Hector-Mountainburg stony fine sandy loams, 3 to 40 percent slopes													2	3		
Jay silt loam, 1 to 3 percent slopes	35	70	35	65	3	4	4	6	350	450	2.5	3.5	6	8	6	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	33	55	32	57	2	3	4	6	300	400	1.5	2.3	5	7	5	7

TABLE 2.—*Predicted average yields per acre of principal crops under two levels of management*—Continued

Soil	Corn		Oats		Green beans		Grapes		Apples		Alfalfa		Pasture			
													Fescue		Hybrid bermuda-grass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Tons	Tons	Bu.	Bu.	Tons	Tons	A.U.M.	A.U.M.	A.U.M.	A.U.M.

Engineering Test Data

Soil samples taken from 16 profiles in the county were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. Each soil was sampled to a depth of about 5 feet. The results of these tests are given in table 3.

The engineering classifications given in table 3 are based on the data obtained by mechanical analysis and on the liquid limit and plasticity index. The mechanical analysis

Normally, only the surface layer of a soil is rated for topsoil. The suitability of this layer depends largely on its texture and depth. Topsoil material must be friable enough to be worked into a good seedbed for seeding or sodding, yet be clayey enough to resist erosion on steep slopes. The depth of suitable material determines the practicality of removal.

Some soils have features that limit their use as reservoir sites and as sources of embankment material for construc-

TABLE 3.—

[Tests performed by Arkansas State Highway Department in cooperation with Bureau of Public Roads (BPR)

Soil name and location	Parent material	Arkansas report number (S6372)	Depth	Horizon	Moisture-density [1]	
					Maximum dry density	Optimum moisture
			In.		*Lb. per cu. ft.*	*Pct.*
Allen loam:						
SE¼SE¼ sec. 17, T. 13 N., R. 30 W. (Nonmodal.)	Colluvium from sandstone and shale.	12–1	0–8	Ap	118	12
		12–4	29–39	B22t	115	15
		12–5	39–45	B23t	114	15
NE¼SE¼ sec. 18, T. 14 N., R. 29 W. (Nonmodal.)	Colluvium from sandstone and shale.	13–1	0–5	Ap	115	13
		13–3	12–20	B22t	110	16
		13–4	20–66	B23t	108	19
SW¼ sec. 28, T. 14 N., R. 29 W. (Modal.)	Colluvium from sandstone and shale.	6–1	0–6	Ap	110	16
		6–4	26–39	B22t	112	17
		6–5	39–67	B23t	113	16
Captina silt loam:						
SW¼NW¼ sec. 30, T. 18 N., R. 30 W. (Modal.)	Silt mantle over cherty limestone.	5–1	0–8	Ap	109	15
		5–3	12–20	B22t	108	16
		5–5	26–54	Bx	108	18
SE¼SE¼ sec. 9, T. 16 N., R. 32 W. (Nonmodal.)	Silt mantle over cherty limestone.	9–1	0–7	Ap	108	15
		9–2	7–20	B21t	110	16
		9–3	20–28	Bx	106	18
Fayetteville fine sandy loam:						
SE¼SE¼ sec. 18, T. 14 N., R. 32 W. (Modal.)	Sandstone.	7–1	0–9	Ap	116	12
		7–3	16–25	B1	115	15
		7–5	36–67	B22t	116	15
NE¼NE¼ sec. 19, T. 17 N., R. 28 W. (Nonmodal.)	Sandstone.	14–1	0–5	Ap	120	11
		14–3	14–31	B2t	114	14
		14–4	31–56	C	115	15
Jay silt loam:						
NE¼NW¼ sec. 36, T. 16 N., R. 32 W. (Modal.)	Silt mantle over siltstone or shale.	4–1	0–9	Ap	110	14
		4–3	16–25	B2t	111	16
		4–5	29–56	B'x	111	16
NE¼SW¼ sec. 35, T. 16 N., R. 32 W. (Nonmodal.)	Silt mantle over siltstone or shale.	8–1	0–8	Ap	107	16
		8–3	16–22	B2t	112	16
		8–4	22–46	B'x	115	15
Johnsburg silt loam:						
NW¼NW¼ sec. 26, T. 16 N., R. 29 W. (Modal.)	Alluvium from sandstone and shale (stream terraces).	1–2	5–8	Ap2	115	14
		1–4	16–23	B21t	116	13
		1–5	23–58	Bx	114	15

Engineering test data

in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (*1*)]

Mechanical analysis [2]					Liquid limit	Plasticity index	Classification	
Percentage passing sieve—								
¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 00 (0.074 mm.)			AASHO	Unified [3]
					Pct.			
100	97	95	90	58	[4] NP	NP	A–4(5)	ML
	100	98	94	75	33	7	A–4(8)	ML
100	97	94	90	70	32	15	A–6(9)	CL
100	99	98	95	80	21	3	A–4(8)	ML
100	99	99	97	89	40	16	A–6(10)	ML–CL
	100	99	98	88	43	17	A–7–6(11)	ML–CL
100	97	93	88	67	31	6	A–4(6)	ML
100	99	98	97	24	37	14	A–2–6(0)	SM–SC
100	97	92	85	62	37	16	A–6(8)	CL
	100	98	94	89	NP	NP	A–4(8)	ML
	100	99	97	92	35	12	A–6(9)	ML–CL
	100	98	95	83	37	16	A–6(10)	CL
100	98	94	90	78	NP	NP	A–4(8)	ML
100	97	91	88	81	35	13	A–6(10)	ML–CL
[5] 79	59	51	48	44	37	13	A–6(3)	GM–GC
100	96	90	83	69	NP	NP	A–4(0)	ML
	100	99	98	40	29	10	A–4(1)	SC
	100	99	98	41	28	11	A–6(2)	SC
	100	99	98	44	NP	NP	A–4(2)	SM
		100	99	60	34	18	A–6(8)	CL
	100	99	99	58	33	14	A–6(6)	CL
100	99	96	92	81	NP	NP	A–4(8)	ML
	100	99	96	90	29	9	A–4(8)	CL
	100	99	97	88	31	10	A–4(8)	ML–CL
	100	98	96	87	NP	NP	A–4(8)	ML
100	99	96	92	80	28	6	A–4(8)	ML–CL
100	97	91	82	70	30	9	A–4(7)	ML–CL
100	99	98	96	61	23	4	A–4(5)	ML–CL
100	99	97	95	65	23	6	A–4(6)	ML–CL
	100	98	95	54	32	16	A–6(6)	CL
100	99	98	96	77	NP	NP	A–4(8)	ML
100	99	99	97	82	28	9	A–4(8)	CL
100	97	95	93	75	25	7	A–4(8)	ML–CL
100	99	97	95	60	NP	NP	A–4(5)	ML
	100	99	96	73	30	10	A–4(8)	CL
	100	98	97	72	29	8	A–4(7)	ML–CL
100	98	94	89	63	NP	NP	A–4(6)	ML
100	98	94	90	68	30	14	A–6(8)	CL
100	98	96	91	68	27	10	A–4(7)	CL
100	98	95	92	52	NP	NP	A–4(4)	ML
100	96	88	85	56	23	8	A–4(4)	CL
[6] 100	89	72	67	40	22	7	A–4(1)	SM–SC

TABLE 3.—*Engineering*

Soil name and location	Parent material	Arkansas report number (S6372)	Depth	Horizon	Moisture-density [1]	
					Maximum dry density	Optimum moisture
			In.		*Lb. per cu. ft.*	*Pct.*
Savannah fine sandy loam—Cont.						
NE¼SE¼ sec. 31, T. 17 N., R. 29 W. (Nonmodal.)	Alluvium from sandstone and shale (stream terraces).	2–2	5–13	A3	118	12
		2–4	17–25	B22t	114	15
		2–6	30–57	Bx	112	15
SW¼NE¼ sec. 12, T. 15 N., R. 29 W. (Nonmodal.)	Alluvium from sandstone and shale (stream terraces).	10–1	0–8	Ap	112	13
		10–3	13–20	B21t	115	14
		10–5	23–38	Bx	114	15

[1] Based on AASHO Designation: T 99–57, Method A (*1*).

[2] Mechanical analysis according to AASHO Designation: T 88 (*1*). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

TABLE 4.—*Esti-*

Soil and map symbol	Depth from surface	Classification
		USDA texture
	In.	
Allegheny:		
Gravelly loam (AeC, AeC2, AeD2).	0–13	Gravelly loam
	13–43	Stony clay loam
	43–74	Clay
Stony loam (AgD, AgF).	0–13	Stony loam
	13–43	Stony clay loam
	43–72	Clay
Allen:		
Loam (AlC2, AlD2, AlE2, AnE).	0–6	Loam
	6–18	Silt loam
	18–72	Clay loam
Stony loam (AoF, AhF, AhG).	0–8	Stony loam
For properties of Hector soils in mapping units AhF and AhG, refer to Hector stony fine sandy loam.	8–68	Stony clay loam
Apison (ApB, ApC2, AsC2).	0–6	Loam
	6–13	Loam
	13–33	Silty clay loam
	33	Sandstone.
Baxter (BaC, BaD, BaE, BaF).	0–10	Cherty silt loam
	10–17	Cherty silty clay loam
	17–60	Cherty clay
Captina (CaB, CaC, CaC2).	0–8	Silt loam
	8–20	Silty clay loam
	20–54	Silty clay loam (fragipan)
	54–60	Chert.
Cherokee (Ch, Ck).	0–24	Silt loam
	24–72	Clay or silty clay

test data—Continued

Mechanical analysis [2]					Liquid limit	Plasticity index	Classification	
Percentage passing sieve—							AASHO	Unified [3]
¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
					Pct.			
	100	99	96	77	24	6	A–4(8)	ML–CL
	100	98	96	80	32	11	A–6(8)	CL
100	99	95	89	67	32	10	A–4(6)	ML–CL
	100	97	93	72	NP	NP	A–4(7)	ML
	100	98	94	89	29	9	A–4(8)	CL
	100	98	96	81	31	12	A–6(9)	CL

[3] SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points of the A-line are to be given a borderline classification. (Examples of borderline classifications obtained by this use are ML–CL, SM–SC, and GM–GC.)

[4] Nonplastic.

[5] An estimated 25 percent of material was larger than 3 inches in diameter and was discarded in field sampling. An estimated 100 percent passed the 2-inch sieve.

[6] An estimated 20 percent of material was larger than 3 inches in diameter and was discarded in field sampling.

mated properties

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					In. per hr.	*In. per in. of soil*	*pH*	
ML	A–4	70–80	55–65	50–60	2. 0–6. 3	0. 14	5. 5–6. 5	Low.
CL	A–6	70–80	60–70	50–60	0. 2–0. 63	. 15	4. 5–6. 0	Medium.
CH	A–7	80–90	70–80	60–70	<0. 2	. 17	4. 5–6. 0	High.
ML	A–4	70–80	55–65	50–60	2. 0–6. 3	. 13	5. 5–6. 5	Low.
CL	A–6	70–80	60–70	50–60	0. 2–0. 63	. 14	4. 5–6. 0	Medium.
CH	A–7	80–90	75–85	70–80	<0. 2	. 17	4. 5–6. 0	High.
ML	A–4	90–100	85–95	58–80	2. 0–6. 3	. 14	5. 5–6. 5	Low.
ML	A–4, A–6	90–100	90–100	75–90	0. 63–2. 0	. 16	5. 0–6. 0	Low.
CL, ML, SM, SC	A–6, A–2, A–7	90–100	90–100	20–90	0. 2–0. 63	. 17	5. 0–6. 0	Medium.

TABLE 4.—*Estimated*

Soil and map symbol	Depth from surface	Classification
		USDA texture
	In.	
Clarksville (ClG).	0–32	Cherty silt loam
	32	Chert bed.
Cleora (Cr).	0–45	Fine sandy loam
	45–72	Loamy fine sand
Elsah (Ec, Eg).	0–72	Gravelly silt loam
Enders (EnC, EnC2, EnD, EnD2, EoD, ErE, ErF).	0–9	Stony loam
For properties of Allegheny soils in mapping units ErE and ErF, refer to Allegheny stony loam.	9–22	Stony clay
	22–84	Clay
Fayetteville:		
Fine sandy loam (FaC2, FaD2, FaE2).	0–9	Fine sandy loam
	9–72	Sandy clay loam
Stony fine sandy loam (FeF, FhF).	0–8	Stony fine sandy loam
For properties of Hector soils in mapping unit FhF, refer to Hector stony fine sandy loam.	8–55	Stony fine sandy loam
Guin (GuC).	0–10	Cherty silt loam
	10–52	Cherty silt loam
Hector:		
Gravelly fine sandy loam (HmC, HmD).	0–7	Gravelly fine sandy loam
	7–17	Gravelly loam
	17	Sandstone.
Stony fine sandy loam (HoF).	0–6	Stony fine sandy loam
	6–15	Stony loam
	15	Sandstone.
Jay (JaB, JaC).	0–16	Silt loam
	16–25	Silty clay loam
	25–72	Silty clay loam (fragipan)
Johnsburg (Jo, Js).	0–12	Silt loam
	12–23	Silty clay loam

properties—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					In. per hr.	*In. per in. of soil*	*pH*	
GM	A–2	40–50	30–40	20–30	2. 0–6. 3	. 07	5. 0–6. 0	Low.
SM or ML	A–4	90–100	80–95	45–55	0. 63–2. 0	. 14	5. 5–6. 5	Low.
SM	A–4	90–100	70–80	40–50	0. 63–2. 0	. 14	5. 5–6. 5	Low.
GM	A–2	15–25	10–20	10–20	2. 0–6. 3	. 10	5. 5–6. 5	Low.
ML	A–4	80–90	55–60	50–60	0. 63–2. 0	. 13	5. 0–6. 0	Low.
MH or CH	A–7	80–100	75–90	75–90	<0. 2	. 16	4. 0–5. 5	Medium.
MH–CH	A–7	90–100	90–100	90–100	<0. 2	. 17	4. 0–5. 5	Medium.
SM	A–2	90–100	90–100	30–45	2. 0–6. 3	. 13	5. 5–6. 5	Low.
SC	A–2 or A–4	90–100	90–100	35–45	0. 63–2. 0	. 17	5. 5–6. 5	Medium.
ML or SC	A–4, A–2	90–100	85–95	30–75	2. 0–6. 3	. 12	5. 5–6. 5	Low.
SC or CL	A–6, A–2	90–100	90–100	35–60	0. 63–2. 0	. 16	5. 5–6. 5	Medium.
GM	A–2	40–60	25–35	20–30	0. 63–2. 0	. 13	5. 5–6. 5	Low.
GM	A–2	40–60	25–35	20–30	0. 63–2. 0	. 14	5. 0–6. 0	Low.
GM	A–2	40–50	30–40	20–30	2. 0–6. 3	. 12	5. 0–6. 5	Low.
GM	A–2	40–50	30–40	20–30	0. 63–2. 0	. 13	4. 5–5. 5	Low.
GM	A–2	40–50	30–40	20–30	2. 0–0. 63	. 12	5. 0–6. 5	Low.
GM	A–2	40–50	30–40	20–30	0. 63–2. 0	. 13	4. 5–5. 5	Low.
ML	A–4	95–100	95–100	80–90	0. 63–2. 0	. 19	5. 0–6. 5	Low.
CL or ML	A–4	95–100	95–100	70–90	0. 2–0. 63	. 21	4. 5–6. 0	Medium.
ML or CL	A–4	95–100	95–100	70–90	<0. 2	. 15	5. 0–6. 5	Low.
ML or ML–CL	A–4	95–100	95–100	60–80	0. 63–2. 0	. 19	5. 5–6. 5	Low.
CL or ML–CL	A–4	95–100	95–100	65–85	0. 2–0. 63	. 17	4. 5–6. 0	Medium.
CL or ML–CL	A–6, A–4	95–100	95–100	50–80	<0. 2	. 17	4. 5–6. 0	Low.
ML	A–4	95–100	95–100	70–80	0. 2–0. 63	. 17	5. 0–6. 0	Low.
ML	A–4	95–100	95–100	75–85	0. 2–0. 63	. 19	4. 0–5. 5	Medium.
CH	A–7	95–100	90–100	80–90	<0. 2	. 17	4. 0–5. 5	High.
ML or CL	A–4	90–100	90–100	70–80	2. 0–6. 3	. 17	5. 0–6. 0	Low.
ML	A–4	90–100	95–100	75–85	0. 2–0. 63	. 19	4. 5–5. 5	Medium.
GM	A–4	65–70	45–55	35–40	2. 0–6. 3	. 16	5. 0–6. 0	Low.
GC	A–4	65–70	55–65	45–50	0. 2–0. 63	. 18	4. 5–5. 5	Medium.
GM	A–4	60–70	45–55	40–50	0. 63–2. 0	. 13	5. 5–6. 5	Low.
GM	A–4	60–70	45–55	40–50	0. 63–2. 0	. 13	5. 0–6. 0	Low.
GM	A–2	30–40	25–35	20–30	0. 63–2. 0	. 14	5. 5–6. 5	Low.
GC	A–2	20–30	15–25	10–20	<0. 2	. 14	5. 0–6. 0	Low.

TABLE 4.—*Estimated*

	Depth	Classification

properties—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					In. per hr.	*In. per in. of soil*	*pH*	
ML	A–4	90–100	85–95	80–90	0. 63–2. 0	. 19	5. 5–6. 5	Low.
CL	A–6	80–90	80–90	70–80	0. 2–0. 63	. 21	5. 0–6. 0	Medium.
GM	A–4	65–75	45–55	35–40	0. 63–2. 0	. 16	5. 5–6. 5	Low.
GC	A–6	65–75	45–65	45–50	0. 2–0. 63	. 16	5. 0–6. 0	Medium.
GM	A–4	65–75	45–55	35–40	0. 63–2. 0	. 16	5. 5–6. 5	Low.
GC	A–6	65–75	55–65	45–50	0. 2–0. 63	. 16	5. 0–6. 0	Medium.
ML	A–4	95–100	95–100	80–95	0. 63–2. 0	. 19	5. 5–6. 5	Low.

TABLE 5.—*Engineering*

Soil and map symbol	Suitability as source of—			Suitability for winter grading
	Road subgrade and fill	Topsoil	Gravel	
Allegheny:				
Gravelly loam (AeC, AeC2, AeD2)	Good	Poor	Poor	Good
Stony loam (AgD, AgF)	Fair: stony	Poor	Poor	Good
Allen:				
Loam (AlC2, AlD2, AlE2)	Good	Fair to good	Poor	Good
Stony loam and gravelly loam (AnE, AoF, AhF, AhG) For properties of Hector soils in mapping units AhF and AhG, refer to Hector-Mountainburg soils.	Good	Poor	Poor	Good
Apison (ApB, ApC2, AsC2)	Good	Good: poor in gravelly spots.	Poor	Good
Baxter (BaC, BaD, BaE, BaF)	Good	Poor	Fair	Good
Captina (CaB, CaC, CaC2)	Good	Good	Poor	Fair
Cherokee:				
Silt loam (Ch)	Poor	Fair	Poor	Poor: water table.
Complex, mounded (Ck)	Poor	Fair	Poor	Poor: water table.
Clarksville (ClG)	Good	Poor	Fair	Good
Cleora (Cr)	Good	Good	Poor	Good
Elsah (Ec, Eg)	Good	Poor	Fair	Fair
Enders:				
Gravelly loam (EnC, EnC2, EnD, EnD2)	Poor: unstable; sloughs.	Poor	Poor	Fair
Stony loam (EoD, ErE, ErF) For properties of Allegheny soils in mapping units ErE and ErF, refer to Allegheny stony loam.	Poor: unstable; sloughs.	Poor	Poor	Fair
Fayetteville:				
Fine sandy loam (FaC2, FaD2, FaE2)	Good	Good	Poor	Good
Stony fine sandy loam (FeF, FhF) For properties of Hector soils in mapping unit FhF, refer to Hector-Mountainburg soils.	Good	Poor: stony	Poor	Good
Guin (GuC)	Good	Poor	Fair	Good
Hector-Mountainburg (HmC, HmD, HoF)	Poor: shallow over bedrock.	Poor	Poor	Good

interpretations

Soil features affecting—					
Farm ponds		Land leveling	Agricultural drainage	Irrigation	Terraces and diversions
Reservoir area	Embankment				
No limiting features	No limiting features	Slopes	Good drainage	Slopes	Slopes.
No limiting features	No limiting features	Steep slopes; stones	Good drainage	Steep slopes; stones	Steep slopes; stones.
High seepage rate	High seepage rate	Steep slopes	Good drainage	Slopes	Most slopes too steep.
Steep slopes; high seepage rate.	High seepage rate	Steep slopes; stones	Good drainage	Steep slopes; stones	Steep slopes.
Moderate depth to bedrock.	Moderate seepage rate.	Slopes; moderate depth to bedrock.	Good drainage	Slopes	No limiting features.
High seepage rate; steep slopes.	High seepage rate; steep slopes.	Slopes; coarse fragments.	Good drainage	Slopes	Most slopes too steep.
Limited depth to bedrock in some areas.	No limiting features.	Gentle slopes	Moderately good drainage.	Gentle slopes	No limiting features.
No limiting features	Low strength and stability.	Mounds; poor drainage.	Seasonally high water table; slow permeability.	Poor drainage	Nearly level.
No limiting features	Low strength and stability.	Poor drainage; nearly level.	Poor drainage; nearly level.	Poor drainage	Nearly level.
High seepage rate; steep slopes.	High seepage rate; steep slopes.	Steep slopes; coarse fragments.	Excessive drainage.	Slopes; coarse fragments.	Steep slopes.
Moderate flood hazard; high seepage rate.	Moderate flood hazard; high seepage rate.	Moderate flood hazard.	Good drainage; moderate flood hazard.	Moderate flood hazard.	Nearly level.
High seepage rate; severe flood hazard.	High seepage rate; severe flood hazard.	Severe flood hazard.	Excessive drainage.	Severe flood hazard.	Nearly level; severe flood hazard.
Low seepage rate; adequate depth.	Sloughs; low seepage rate; low strength and stability.	Slopes; thin topsoil	Moderately good drainage.	Slopes	Most slopes too steep.
Low seepage rate; adequate depth.	Sloughs; low seepage rate; low strength and stability.	Steep slopes; thin topsoil.	Moderately good drainage.	Steep slopes	Steep slopes.
High seepage rate	High seepage rate	Slopes too steep	Good drainage	Gentle slopes suitable for sprinkler.	Some slopes too steep.
High seepage rate; steep slopes.	High seepage rate	Steep slopes	Good drainage	Steep slopes	Steep slopes.
High seepage rate	High seepage rate	Slopes	Good drainage	Slopes	No limiting features.
Shallow over bedrock; high seepage	Limited borrow material; high	Shallow over bedrock; slopes.	Good drainage to somewhat exces-	Poor agricultural soil.	Shallow over bedrock; stones.

TABLE 5.—*Engineering*

Soil and map symbol	Suitability as source of—			Suitability for winter grading
	Road subgrade and fill	Topsoil	Gravel	
Jay (JaB, JaC)	Good	Good	Poor	Fair
Johnsburg (Jo, Js)	Fair: water table.	Fair	Poor	Fair: water table.
Leaf (Le, Lf)	Poor	Fair	Poor	Poor
Linker (LkB, LkC2, LnC2, LnD)	Good	Good; poor in gravelly spots.	Poor	Good
Montevallo (MoD, MoE)	Poor: shallow over bedrock.	Poor: stones	Poor	Good
Nixa (NaC, NaD)	Good	Poor	Fair to poor	Good
Pembroke:				
Silt loam (PeB, PeC2)	Good	Good to fair	Poor: gravel below a depth of 3 feet.	Good
Gravelly silt loam (PgC2)	Good	Poor	Fair	Good
Pickwick:				
Gravelly loam (PkC2, PkD2)	Good	Poor	Fair	Good
Silt loam (PsB, PsC2)	Good	Good to fair	Poor	Good
Razort:				
Silt loam and loam (Ra, Rk)	Good	Good	Poor	Good
Gravelly silt loam (Rg)	Good	Poor	Fair	Good
Rock land (Ro)	Poor	Poor	Poor	Poor
Samba (Sa, Sb)	Poor	Fair	Poor	Poor
Savannah (SfB, SfC2)	Good	Good	Poor	Fair
Sloan (Sn)	Good	Good	Poor	Fair

interpretations—Continued

Soil features affecting—					
Farm ponds		Land leveling	Agricultural drainage	Irrigation	Terraces and diversions
Reservoir area	Embankment				
No limiting features	No limiting features	Gentle slopes	Good drainage	Slopes	No limiting features.
No limiting features	No limiting features	Somewhat poor drainage.	Slow permeability; seasonally high water table.	Somewhat poor drainage; slow permeability.	No limiting features; gentle slopes.
No limiting features	Low strength and stability.	Poor drainage; some areas mounded.	Very slow permeability; seasonally high water table.	Poor drainage; very slow permeability.	Nearly level.
Moderate depth to bedrock.	Moderate seepage rate.	Slopes; moderate depth to bedrock.	Good drainage	Slopes	No limiting features.
Shallow over bedrock; high seepage rate.	Limited borrow material; high seepage rate.	Shallow over bedrock; slopes.	Somewhat excessive drainage.	Poor agricultural soil.	Shallow over bedrock; stones.
Coarse fragments	Coarse fragments; high seepage rate.	Slopes; coarse fragments.	Moderately good drainage.	Coarse fragments; low water capacity.	Coarse fragments.
Moderate seepage rate.	Moderate seepage rate.	Slopes	Good drainage	Slopes	No limiting features.
Moderate to high seepage rate.	Moderate to high seepage rate.	Slopes	Good drainage	Slopes	No limiting features.
Moderate to high	Moderate to high	Slopes	Good drainage	Slopes	No limiting

TABLE 5.—*Engineering*

Soil and map symbol	Suitability as source of—			Suitability for winter grading
	Road subgrade and fill	Topsoil	Gravel	
Sogn (So)	Poor	Poor	Poor	Good
Summit:				
Silty clay (Sp, SsA, SsB, SsC2, SsD2)	Poor: high shrink-swell potential.	Poor	Poor	Poor
Stony silty clay (StD2, StE2)	Poor: high shrink-swell potential.	Poor	Poor	Fair
Taloka (Ta, ToA, ToB)	Fair	Poor	Poor	Poor

ity index. The clay mineralogy indicates no serious limitation to its use as engineering material.

Johnsburg silt loam.—Johnsburg soils are somewhat poorly drained and have a fragipan. They formed in silty material.

Vermiculite and kaolinite are the dominant clay minerals. As shown in table 6, profile 72–1 contains slightly

not high, and both profiles have a low plasticity index.

Savannah silt loam.—Savannah soils are similar to Johnsburg soils except that they are moderately well drained.

As shown in table 6, the mineralogy of the two profiles sampled is essentially a mixture of vermiculite and kaolinite. Vermiculite is dominant in the coarse clays of one

interpretations—Continued

Soil features affecting—					
Farm ponds		Land leveling	Agricultural drainage	Irrigation	Terraces and diversions
Reservoir area	Embankment				
Rocks; shallow over	Rocks; limited bor	Slopes; rocks; shal	Excessive drainage	Poor agricultural	Shallow over

TABLE 6.—*Clay mineralogy*

Soil	Sample number	Horizon	Depth from surface	Fine silt (5 to 2 microns)		Coarse clay (2 microns to 0.2 micron)	
				Percentage of sample	Mineralogy	Percentage of sample	Mineralogy
			In.				
Fayetteville fine sandy loam.	S–63–Ark–72–7–1	Ap	0–9	2. 5	80 percent quartz, 10 percent illite, 6 percent kaolinite, 3 percent potash feldspar, 1 percent plagioclase feldspar.	6. 6	30 percent kaolinite, 20 percent illite, 20 percent vermiculite, 15 percent quartz, 10 percent illite and vermiculite, 5 percent gibbsite.
	S–63–Ark–72–7–3	B1	16–25	2. 0	75 percent quartz, 15 percent illite, 5 percent kaolinite, 4 percent potash feldspar, 1 percent plagioclase feldspar.	10. 9	30 percent kaolinite, 30 percent vermiculite, 20 percent illite, 10 percent quartz, 5 percent illite and vermiculite, 5 percent gibbsite.
	S–63–Ark–72–7–5	B22t	36–44	1. 1	75 percent quartz, 15 percent illite, 8 percent kaolinite, 2 percent potash feldspar.	13. 3	30 percent kaolinite, 30 percent vermiculite, 20 percent illite, 10 percent illite and vermiculite, 5 percent quartz, 5 percent gibbsite.
	S–63–Ark–72–7–5	B22t	52–67	1. 4	75 percent quartz, 15 percent illite, 8 percent kaolinite, 2 percent potash feldspar.	7. 8	30 percent kaolinite, 30 percent vermiculite, 20 percent illite, 10 percent quartz, 5 percent illite and vermiculite, 5 percent gibbsite.
Jay silt loam.	S–63–Ark–72–4–1	Ap	0–9	2. 1	90 percent quartz, 6 percent illite, 3 percent potash feldspar, 1 percent plagioclase feldspar.	4. 3	35 percent interstratified vermiculite and montmorillonite, 30 percent kaolinite, 20 percent illite, 15 percent quartz.
	S–63–Ark–72–4–3	B2t	16–25	4. 1	75 percent quartz, 15 percent illite, 5 percent kaolinite, 4 percent vermiculite, 1 percent potash feldspar.	1. 2	35 percent interstratified vermiculite and illite, 25 percent illite, 20 percent kaolinite, 10 percent interstratified vermiculite and montmorillonite, 10 percent quartz.
	S–63–Ark–72–4–5	Bx2	29–46	6. 1	65 percent quartz, 20 percent illite, 8 percent kaolinite, 5 percent vermiculite, 2 percent potash feldspar.	7. 9	40 percent interstratified vermiculite and illite, 30 percent kaolinite, 20 percent illite, 10 percent quartz.
	S–63–Ark–72–4–5	Bx2	46–56	-------	70 percent quartz, 15 percent illite, 8 percent kaolinite, 6 percent potash feldspar, 1 percent plagioclase feldspar.	11. 8	45 percent interstratified vermiculite and montmorillonite, 30 percent kaolinite, 15 percent illite, 10 percent quartz.
Johnsburg silt loam.	S–63–Ark–72–1–2	Ap2	5–8	5. 1	75 percent quartz, 10 percent illite, 8 percent kaolinite, 5 percent vermiculite, 1 percent potash feldspar, 1 percent plagioclase feldspar.	7. 8	40 percent kaolinite, 35 percent vermiculite, 15 percent illite, 10 percent quartz.

See footnote at end of table.

of selected soils—Continued

Medium clay (0.2 to 0.08 micron)		Fine clay (less than 0.08 micron)		Total percentage of clay	Calculated cation-exchange capacity of clay fraction	Percentage of free iron as Fe_2O_3
Percentage of sample	Mineralogy	Percentage of sample	Mineralogy			
					Meq./100 gm.	
5. 7	40 percent kaolinite, 40 percent illite, 20 percent amorphous material.	(1)	----------	12. 3	----------	1. 6
3. 7	30 percent montmorillonite, 20 percent vermiculite, 15 percent amorphous material, 15 percent interstratified vermiculite and montmorillonite, 10 percent illite, 10 percent kaolinite.	1. 0	60 percent amorphous material, 20 percent montmorillonite, 10 percent vermiculite, 10 percent interstratified vermiculite and montmorillonite.	15. 6	40	2. 8
6. 7	40 percent amorphous material, 20 percent montmorillonite, 15 percent vermiculite, 10 percent illite, 10 percent kaolinite, 5 percent interstratified vermiculite and montmorillonite.	2. 7	50 percent amorphous material, 50 percent montmorillonite and vermiculite.	22. 7	38	3. 4
30. 3	75 percent amorphous material, 10 percent illite, 10 percent interstratified vermiculite and montmorillonite, 5 percent montmorillonite.	(1)	----------	38. 1	35	4. 3
1. 9	50 percent vermiculite and montmorillonite, 25 percent amorphous material, 15 percent illite, 10 percent kaolinite.	(1)	----------	6. 2	----------	. 8
15. 3	55 percent amorphous material, 30 percent interstratified vermiculite and montmorillonite, 10 percent illite, 5 percent kaolinite.	3. 4	60 percent montmorillonite, 40 percent amorphous material.	19. 9	48	1. 3
8. 4	60 percent amorphous material, 25 percent interstratified vermiculite and montmorillonite, 15 percent illite.	2. 2	55 percent montmorillonite, 45 percent amorphous material.	18. 5	52	1. 6
6. 2	40 percent interstratified vermiculite and montmorillonite, 40 percent amorphous material, 20 percent illite.	3. 6	50 percent amorphous material, 50 percent montmorillonite.	21. 6	53	1. 6
1. 9	50 percent vermiculite, 25 percent	1. 7	60 percent amorphous mate-	11. 4	78	. 6

TABLE 6.—*Clay mineralogy*

Soil	Sample number	Horizon	Depth from surface	Fine silt (5 to 2 microns)		Coarse clay (2 microns to 0.2 micron)	
				Percentage of sample	Mineralogy	Percentage of sample	Mineralogy
			In.				
Johnsburg silt loam—Con.	S–63–Ark–72–1–4	B2t	16–23	6. 3	80 percent quartz, 12 percent illite, 7 percent kaolinite, 1 percent potash feldspar.	8. 5	40 percent kaolinite, 20 percent vermiculite, 18 percent illite, 12 percent quartz, 10 percent interstratified vermiculite and illite.
	S–63–Ark–72–1–5	Bxg	23–58	5. 6	75 percent quartz, 17 percent illite, 7 percent kaolinite, 1 percent potash feldspar.	16. 5	40 percent kaolinite, 25 percent vermiculite, 15 percent interstratified vermiculite and illite, 10 percent illite, 10 percent quartz.
Johnsburg silt loam.	S–63–Ark–72–16–1	Ap	0–6	4. 1	75 percent quartz, 15 percent illite, 8 percent kaolinite, 2 percent potash feldspar.	3. 9	35 percent vermiculite, 35 percent kaolinite, 20 percent illite, 10 percent quartz.
	S–63–Ark–72–16–3	Btg	9–20	6. 5	78 percent quartz, 12 percent illite, 9 percent kaolinite, 1 percent potash feldspar.	8. 4	35 percent vermiculite, 35 percent kaolinite, 22 percent illite, 8 percent quartz.
	S–63–Ark–72–16–4	Bxg	20–40	-------	85 percent quartz, 7 percent illite, 5 percent kaolinite, 2 percent potash feldspar, 1 percent plagioclase feldspar.	10. 0	40 percent vermiculite, 35 percent kaolinite, 20 percent illite, 5 percent quartz.
Savannah fine sandy loam.	S–63–Ark–72–2–2	A3	5–13	4. 7	80 percent quartz, 10 percent illite, 9 percent kaolinite, 1 percent pot-	5. 8	35 percent vermiculite, 30 percent kaolinite, 20 per-

of selected soils—Continued

Medium clay (0.2 to 0.08 micron)		Fine clay (less than 0.08 micron)		Total percentage of clay	Calculated cation-exchange capacity of clay fraction	Percentage of free iron as Fe_2O_3
Percentage of sample	Mineralogy	Percentage of sample	Mineralogy			
					Meq./100 gm.	
2. 7	35 percent vermiculite, 30 percent interstratified vermiculite and illite, 25 percent amorphous material, 10 percent kaolinite.	2. 3	50 percent amorphous material, 50 percent montmorillonite.	13. 5	51	. 6
6. 0	30 percent vermiculite, 30 percent interstratified vermiculite and illite, 20 percent montmorillonite, 10 percent amorphous material, 10 percent kaolinite.	3. 2	50 percent amorphous material, 50 percent montmorillonite.	25. 7	57	1. 5
4. 4	75 percent interstratified vermiculite and montmorillonite, 10 percent kaolinite, 8 percent amorphous material, 7 percent illite.	(1)	----------	8. 3	----------	. 9
7. 5	67 percent interstratified vermicu-	1. 3	75 percent montmorillonite.	17. 2	57	1. 4

TABLE 7.—*Degree and kind of limitation for building*

Soil	Slope	Dwellings served by public or community sewage system	Dwellings served by septic tank filter fields

sites, recreational facilities, and trafficways

Recreation		Light industry	Trafficways
Campsites or picnic areas	Intensive play areas		
Slight	Slight	Slight	Slight.
Slight	Moderate: moderate trafficability.	Moderate: slope	Slight.
Severe: poor trafficability; slope.	Severe: poor trafficabliity; slope.	Severe: slope	Severe: slope; erodibility.
Very slight	Moderate	Very slight	Very slight.
Severe: slope; poor trafficability.	Severe: slope; poor trafficability.	Severe: slope	Moderate: slope; erodibility.
Severe: poor trafficability; slope.	Severe: poor trafficablity; slope.	Severe: slope	Moderate: slope; erodibility.
Very slight	Very slight	Very slight	Very slight.
Slight	Moderate: moderate trafficability.	Slight	Slight.
Moderate: moderate trafficability.	Moderate: moderate trafficability; slope.	Moderate: slope	Slight.
Severe: poor trafficability	Severe: slope; poor trafficability.	Severe: slope; poor trafficability.	Moderate: slope.
Severe: slope; poor trafficability.	Severe: slope; poor trafficability.	Severe: slope; chert at a depth of 3 to 6 feet.	Severe: coarse fragments.
Slight	Slight	Slight	Slight.
Severe: poor trafficability	Very severe: poor trafficability.	Severe: seasonal high water table; low bearing capacity.	Severe: seasonal high water table; low traffic-supporting capacity.
Severe: slope; poor	Very severe: slope; poor	Severe: chert bed at a depth of	Severe: chert bed at a depth

TABLE 7.—*Degree and kind of limitation for building*

Soil	Slope	Dwellings served by public or community sewage system	Dwellings served by septic tank filter fields

sites, recreational facilities, and trafficways—Continued

Recreation		Light industry	Trafficways
Campsites or picnic areas	Intensive play areas		
Slight	Slight	Slight	Slight.
Moderate: moderate trafficability.	Severe: poor trafficability	Severe: shallow over rock	Moderate: shallow over rock.
Severe: poor trafficability	Severe: shallow over rock	Severe: shallow over rock	Severe: shallow over rock.
Slight	Slight	Slight	Slight.
Severe: poor trafficability	Severe: poor trafficability	Severe: low bearing capacity; seasonal high water table.	Severe: low traffic-supporting capacity; seasonal high water table.
Severe: poor trafficability	Very severe: poor trafficability.	Severe: seasonal high water table; low bearing capacity.	Severe: seasonal high water table; low traffic-supporting capacity.
Very slight Moderate: moderate trafficability.	Very slight Moderate: moderate trafficability; slope.	Very slight Moderate: slope	Very slight. Slight.
Severe: poor trafficability; erodibility.	Very severe: poor trafficability; shallow over rock.	Severe: shallow over rock	Severe: shallow over rock.
Slight	Moderate: moderate trafficability.	Slight	Slight.
Very slight	Very slight	Very slight	Very slight.
Very slight Slight	Very slight Moderate: slope; moderate trafficability.	Very slight Moderate: slope	Very slight. Slight.
Severe: poor trafficability	Very severe: poor trafficability.	Severe: severe flood hazard	Severe: severe flood hazard; low traffic-supporting capacity.
Slight	Slight	Moderate: flood hazard	Slight.
Very severe: slope; stony and rocky; poor trafficability.	Very severe: slope; stony and rocky; poor trafficability.	Very severe: slope; shallow over rock.	Very severe: slope; shallow over rock.
Very severe: poor trafficability	Very severe: poor trafficability	Very severe: seasonal high water table; low bearing capacity.	Very severe: seasonal high water table; low traffic-supporting capacity.
Slight	Slight	Slight	Slight.
Severe: poor trafficability	Very severe: poor trafficability.	Severe: severe flood hazard; low bearing capacity; seasonal high water table.	Severe: severe flood hazard; low traffic-supporting capacity; seasonal high water table.
Severe: poor trafficability	Very severe: poor trafficability; shallow over rock.	Very severe: slope; shallow over rock.	Very severe: shallow over rock.
Severe: poor trafficability; seasonal high water table.	Very severe: poor trafficability; seasonal high water table.	Very severe: low bearing capacity; high shrink-swell potential; seasonal high water table.	Very severe: high shrink-swell potential; low traffic-supporting capacity.
Severe: poor trafficability	Severe: poor trafficability	Very severe: low bearing capacity; high shrink-swell potential.	Very severe: high shrink-swell potential; low traffic-supporting capacity.
Moderate: moderate trafficability.	Moderate: moderate trafficability.	Moderate: moderate bearing capacity.	Severe: low traffic-supporting capacity.

The features considered significant in determining the limitations of the soils include slope, percolation rate, erosion hazard, water table, flood hazard, shrink-swell potential, bearing capacity, traffic supporting capacity, depth to

intensive drainage or flood-control measures to make them suitable for heavy construction. A fragipan presents problems of drainage, and a high shrink-swell potential presents problems of stability that may

Potential productivity: The important wood crops for the soils of each group are listed under this heading, and

Forage condition is the present state of the understory vegetation as compared with the potential for a particular

TABLE 8.—*Woodland groups*

[Dashes indicate data

Woodland group and map symbols	Potential productivity		
	Important wood crops [1]	Estimated site index range [2]	Estimated yearly growth [3]
		Bd. ft./acre Doyle rule	
Group 1 (Cr, Sn, Ra, Rg, Rk).	Red oak	80–85	195–240
	Sweetgum	80–85	215–260
	Black walnut	80–85	---
	Shortleaf pine	80–85	314–386
	Cottonwood	85–90	285–345
	Sycamore	85–90	270–315
Group 2 (Ec, Eg).	Red oak	70–80	120–195
	Shortleaf pine	70–80	210–314
	Black walnut	70–80	---
	Eastern redcedar	50–60	150–170
Group 3 (FaC2, PeB, PeC2, PgC2, PkC2, PkD2, PsB, PsC2).	Red oak	70–75	120–155
	Shortleaf pine	70–75	210–262
	Black walnut	70–75	---
	Eastern redcedar	50–55	150–160
Group 4 (FaD2, FaE2, FeF, FhF).	Red oak	70–75	120–155
	Shortleaf pine	70–75	210–262
	Black walnut	70–75	---
	Eastern redcedar	50–55	150–160
Group 5 (ApB, ApC2, AsC2, BaC, CaB, CaC, CaC2, LkB, LkC2, LnC2, SfB, SfC2)	Red oak	60–65	70–95

and factors in management

not available]

Preferred species—		Management problems		
In existing stands	For planting	Erosion hazard	Equipment limitation	Seedling mortality
Red oak, sweetgum, water oak, black walnut, sycamore, cottonwood, black locust, shortleaf pine, white ash, black cherry, white oak.	Red oak, Shumard oak, black walnut, shortleaf pine, cottonwood, black locust.	Slight	Slight	Slight.
Red oak, black walnut, white oak, Shumard oak, eastern redcedar, black locust, water oak, sweetgum, cottonwood, sycamore, white ash.	Sweetgum, red oak, eastern redcedar, black locust, black walnut, cottonwood, sycamore, white ash, Shumard oak, shortleaf pine.	Slight	Moderate	Severe.
Shortleaf pine, Shumard oak, black walnut, eastern redcedar, white oak, black locust, sweetgum, red oak.	Shortleaf pine, red oak, eastern redcedar, black locust, Shumard oak, black walnut.	Slight	Slight	Slight.
Red oak, shortleaf pine, black walnut, eastern redcedar, sweetgum, black locust, white oak, Shumard oak.	Shortleaf pine, red oak, Shumard oak, eastern redcedar, black walnut, [4] black locust. [4]	Moderate	Severe	Slight.
Shortleaf pine, red oak, white oak, eastern redcedar, black locust, black walnut.	Shortleaf pine, eastern redcedar, red oak, [4] white oak. [4]	Slight	Slight	Slight.
Shortleaf pine, eastern redcedar, red oak, [4] black walnut, black locust. [4]	Shortleaf pine, eastern redcedar, red oak, [5] black locust, [4] black walnut. [4]	Moderate	Moderate	Moderate.
Shortleaf pine, eastern redcedar, red oak, [5] black walnut, black locust. [5]	Shortleaf pine, eastern redcedar, red oak, [5] black locust, [5] black walnut. [5]	Severe	Severe	Severe.
Shortleaf pine, sweetgum, water oak, southern red oak.	Sweetgum, water oak, red oak, shortleaf pine. [6]	Moderate	Moderate	Slight.
Sweetgum, water oak, southern red oak, white ash.	Sweetgum, white ash, water oak	Slight	Severe	Severe.
Shortleaf pine, eastern redcedar	Shortleaf pine, eastern redcedar	Severe	Moderate to severe.	Moderate.
Water oak, sweetgum, white ash	Sweetgum, water oak, white ash, catalpa, Osage-orange (bois d'arc), shortleaf pine, eastern redcedar. [7]	Moderate	Moderate	Severe.
Shortleaf pine, eastern redcedar	None	Severe	Severe	Severe.
None	None			

managed stands to age 60. The yields for hardwoods are adapted from published research on southern hardwoods (*12*) and upland central hardwoods (*14*) and tree growth data from soil-site studies by the U.S. Soil Conservation Service.

[4] On cool slopes that are in coves, on beaches, along drains, or in deep pockets.

[5] On all but hot, or southerly, slopes.

[6] On slopes of more than 1 percent.

[7] On slopes of more than 3 percent.

uniola, eastern gamagrass, and broadleaf forbs, such as sunflower, goldenrod, and wild aster. As these plants decrease under heavy grazing, such plants as sedge, low panicum, Kentucky bluegrass, white snakeroot, ragweed, brier, and other woody plants increase. As the canopy closes, many plants that do not tolerate shade disappear.

Under a dense canopy, forage production is 200 to 500 pounds per acre; under a medium canopy, 500 to 2,000 pounds per acre; under a sparse canopy, 1,000 to 3,500 pounds per acre; under an open canopy, 1,500 to 4,500 pounds per acre; and under little or no canopy, 2,000 to 5,000 pounds per acre.

Woodland group 3

This group consists of soils of the Fayetteville, Pembroke, and Pickwick series. These are deep, well-drained, medium-textured soils on uplands and stream terraces. Most of these soils are eroded. The slope range is 1 to 12 percent. The available water capacity is moderate, permeability is moderate, and runoff is medium.

These soils are moderately productive of pines and hardwoods. The soil-related management problems are slight.

If the overstory is thinned, these soils produce large amounts of understory vegetation. If the forage condition

1,500 to 4,000 pounds per acre; under an open canopy, 2,000 to 5,000 pounds per acre; and under little or no canopy, 2,500 to 5,200 pounds per acre.

Woodland group 5

This group consists of soils of the Apison, Baxter, Captina, Linker, and Savannah series. These are deep, medium-textured, moderately well drained and well drained soils on uplands and stream terraces. Some of these soils are eroded. Some are gravelly or cherty. The slope range is 1 to 8 percent. The available water capacity is moderate, permeability is slow to moderate, and runoff is slow or medium.

These soils are moderately productive of pines (fig. 12) and hardwoods. The soil-related management problems are slight.

If the overstory is thinned, these soils produce large amounts of understory vegetation. If the forage condition

drained and somewhat poorly drained, level or mounded soils on uplands and stream terraces. The available water capacity is moderate, permeability is very slow or slow, and runoff is slow.

These soils are only moderately productive of pines and hardwoods. The level soils are better suited to hardwoods than to pines. The mounded soils are suited to both. There are slight to moderate soil-related management problems, caused by a high water table and excess water.

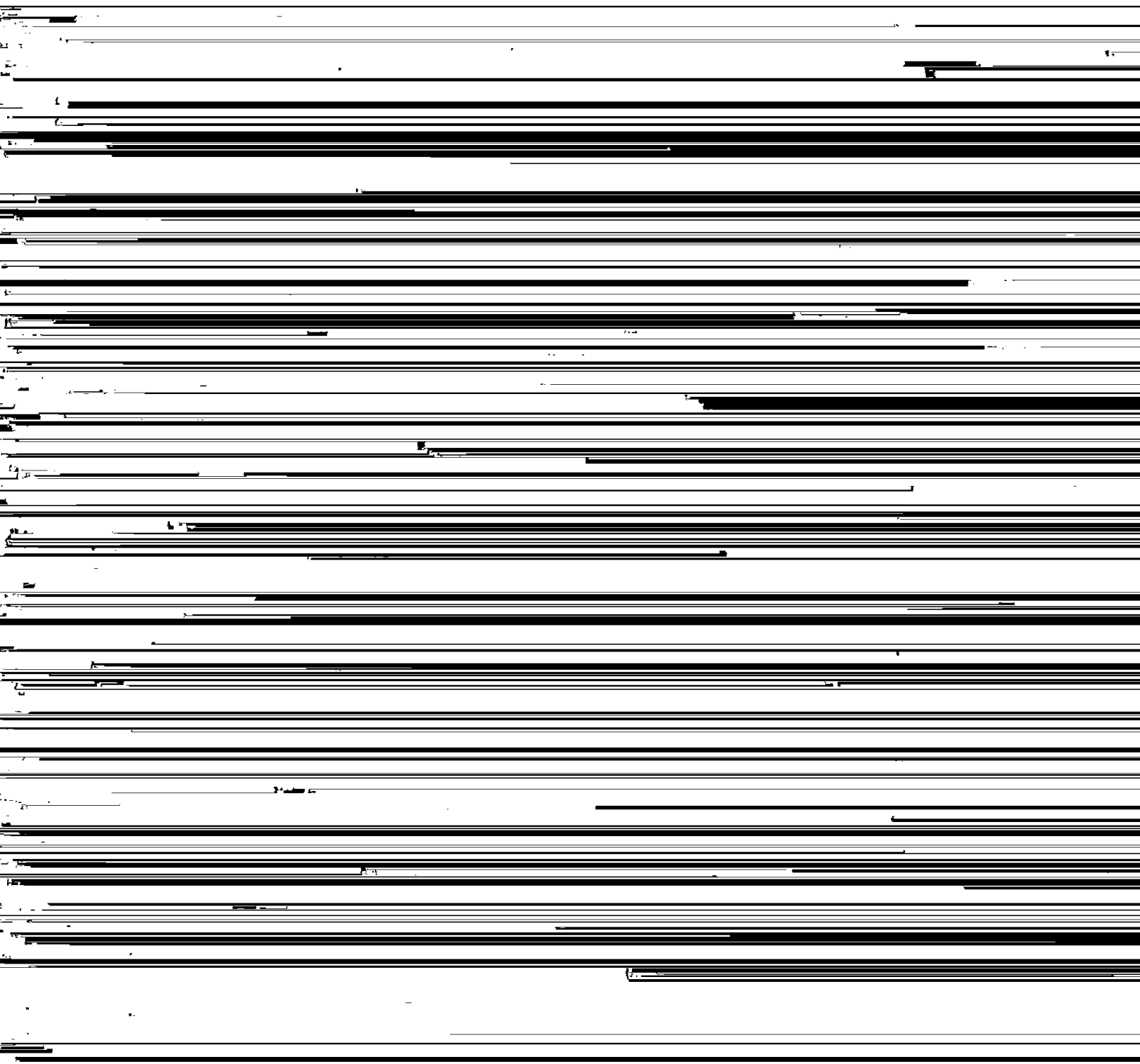
If the overstory is thinned, these soils produce moderate amounts of understory vegetation. The potential plants are switchgrass, Florida paspalum, big bluestem, little bluestem, beaked panicum, sedge, aster, goldenrod, and other forbs. As the plant community deteriorates, the tall grasses are replaced by longspike tridens, low panicum,

to managing them for pulpwood and small-diameter logs instead of for large-diameter logs.

For information on forage production, refer to the descriptions of the Chert Hills, Claybreak Shale, and Sandstone Ridge range sites, under the heading "Use of the Soils for Range."

Woodland group 11

This group consists of soils of the Montevallo and Summit series. These are shallow to deep, excessively drained to moderately well drained soils. They occur mostly as broad areas on uplands or as mountain foot slopes. The slope range is 1 to 25 percent. The Montevallo soils are 10 to 20 inches thick over shale. The Summit soils are 36 to



On well-managed prairie and savannah rangeland, the vegetation consists of native perennial legumes and forbs and a mixture of tall grasses, chiefly big bluestem, little bluestem, indiangrass, and switchgrass. Much of the potential rangeland in this county is now producing below its capacity. Control of brush and of low-grade hardwoods is needed to improve production and allow the better range plants to recover.

Range Sites and Condition Classes

Different kinds of soils produce different kinds of grass and other vegetation. The soils that have similar climatic and physiographic features and that produce about the lowing heavy rainfall, for example, may appear to improve the condition of the site, when actually the cover is weedy and productivity is declining.

Descriptions of Range Sites

Six range sites are recognized in Washington County. They do not include all the soils of the county but only those used exclusively or mainly as native range. The "Guide to Mapping Units" shows the range site classification of each of these soils.

The six range sites are described in the following pages. The soil series represented are named in the description of each site, but this does not mean that all the soils of a

pounds per acre. In unfavorable years, it is about 2,500 pounds per acre.

Sandstone Ridge range site

This site consists of Hector and Mountainburg soils. These are loamy, permeable, shallow and very shallow soils derived from hard, massive sandstone. They have stones and gravel throughout the profile. The soils are low in plant nutrients and have low available water capacity.

If this site is in excellent condition, the vegetation consists predominantly of little bluestem. There are moderate amounts of indiangrass, big bluestem, low panicum, native legumes, and forbs, and scattered post oak, blackjack oak, and hickory trees. Perennial three-awn, dryland sedge, broomsedge, splitbeard bluestem, ironweed, and unwanted woody species are predominant if the range is in poor condition.

In favorable years, forage production is about 4,800 pounds per acre. In unfavorable years, it is about 2,000 pounds per acre.

Shale Break range site

This site consists of soils of the Montevallo series. These are shallow and very shallow, stony or rocky silt loams or fine sandy loams over shale. They have low to moderate

and several small to moderately large minnow farms are in operation. The quality of the water is moderate on soils derived from acid shale and sandstone and good on soils derived from limestone or cherty limestone.

The soils of Washington County have been assigned to nine groups, according to their suitability as habitat for specified kinds of wildlife. Each of these groups is described in the paragraphs that follow. To find the wildlife group for a specified soil, refer to the "Guide to Mapping Units."

A list of plants that provide food for wildlife is shown in table 9. The suitability of each plant for the soils of each wildlife group is also shown, and the suitability of each plant as food for specified kinds of wildlife.

Wildlife group 1

This group consists of gravelly and nongravelly, moderately well drained to excessively drained soils adjacent to streams. It makes up 7.2 percent of the county. About 70 percent of the acreage is used for row crops, pasture, and meadow, and the rest is woodland. The slope range is 0 to 3 percent. The overflow hazard is slight to severe.

These soils are well suited to wildlife food crops. They are unsuited to fish culture, because they are too permeable for impoundments.

TABLE 9.—*Suitability of plants for wildlife groups and as food for wildlife*

[The figure 1 indicates that the plant is suited to the soils in the given group; the figure 2, that it is marginally suited; the figure 3, that it is poorly suited or not suited. The letter A indicates that the plant is *choice* (attractive and nutritious) for the given kind of wildlife; the letter B, *fair* (eaten only when choice foods are not available); the letter C, *unimportant* (eaten only in small amounts)]

Plant	Wildlife groups									Food for—								
																Nongame birds [1]		
	1	2	3	4	5	6	7	8	9	Bobwhite	Deer	Dove	Rabbit	Squirrel	Turkey	Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Alfalfa	2	2	2	2	3	3	3	3	3	C	A	C	A	C	C	C	C	C
Amaranth (pigweed)	3	3	1	2	2	3	3	3	3	B	C	A	C	C	C	C	B	C
Ash	1	2	3	3	3	3	3	3	3	B	B	C	C	B	B	C	B	B
Barley	1	1	1	2	2	3	3	3	3	B	B	B	B	A	A	C	B	C
Barnyardgrass	1	1	1	2	1	3	3	3	3	C	C	A	C	C	C	C	B	C
Beautyberry	3	3	1	2	2	1	2	2	3	B	B	C	C	C	C	B	B	C
Blackberry	3	2	1	2	1	2	3	3	3	A	B	C	C	A	A	A	C	A
Blackgum	1	3	2	2	1	1	2	3	3	B	B	C	C	B	A	A	C	C
Black locust	3	3	1	2	2	1	3	3	3	B	C	C	C	C	B	C	C	B
Bristlegrass (setaria)	1	1	1	1	2	1	3	2	3	A	B	A	C	C	B	C	A	C
Browntop millet	1	1	1	2	2	2	3	3	3	A	B	A	A	C	A	C	A	C
Cedar, red	3	3	2	2	2	2	2	1	2	C	B	C	C	C	C	A	C	C
Cherry, black	2	3	1	2	2	1	3	3	3	A	B	C	C	A	B	A	C	C
Corn	2	2	1	2	2	3	3	3	3	A	A	A	A	A	A	C	A	A
Cowpeas	2	2	1	2	2	3	3	3	3	A	A	B	A	C	A	C	C	C
Croton, woolly	2	1	1	1	1	1	2	2	2	A	C	A	C	B	A	C	B	A
Dewberry	1	1	1	2	1	1	3	2	3	A	B	C	B	C	A	A	C	A
Dogwood	3	3	2	1	2	1	2	3	2	A	A	C	C	B	A	A	C	B
Elderberry	1	3	1	2	2	1	3	3	2	C	A	C	C	C	B	A	C	C
Elms	1	1	1	2	2	1	3	3	3	C	B	C	C	A	B	C	B	C
Farkleberry (winter huckleberry)	3	3	3	2	2	2	1	1	1	B	B	C	C	B	B	B	C	C
Fescuegrass	1	1	1	1	1	1	3	2	2	C	B	C	C	C	B	C	C	C
Grape, wild	1	3	1	1	2	1	2	3	2	C	A	C	C	C	B	A	C	C
Greenbrier	1	1	1	1	1	1	2	1	2	C	A	C	C	A	C	B	C	C
Hackberry	1	1	2	2	2	2	3	3	3	B	A	C	C	C	B	A	C	C
Hawthorn	2	2	1	1	2	1	2	3	2	C	B	C	C	C	B	B	C	C
Hickory	1	3	1	1	1	1	2	3	2	C	B	C	C	C	A	C	C	A
Honeysuckle	1	2	1	1	1	1	3	3	2	C	A	C	C	C	B	C	C	C
Honeysuckle and blueberry	2	3	1	2	2	1	2	3	2	B	B	C	C	C	B	C	C	A
Japanese millet	1	1	2	2	1	2	3	3	3	A	C	A	C	C	B	C	C	A
Johnsongrass	1	1	1	3	3	3	3	3	3	B	B	B	C	C	C	C	B	C
Lespedeza, bush	2	2	1	1	2	1	3	3	3	A	A	C	B	B	C	C	C	C
Lespedeza, annual	1	1	1	2	2	2	2	2	2	A	A	B	B	C	B	C	B	C
Lespedeza, sericea	1	1	1	1	2	2	2	3	2	C	C	C	B	C	C	C	C	C
Lespedeza, wild	3	1	2	2	2	1	2	2	2	C	B	C	B	C	C	C	C	C
Maple	1	3	1	2	2	1	3	3	2	C	A	C	C	C	B	C	C	C
Milkpea	3	1	1	2	2	1	2	2	2	A	B	C	C	A	C	C	C	C
Mulberry	1	3	1	2	2	1	3	3	2	A	B	C	C	C	A	C	A	C
Oak (acorns)	1	3	1	1	1	1	2	3	2	A	A	C	C	A	A	C	C	A
Oats	1	1	1	2	2	3	3	3	3	A	A	B	A	A	A	C	A	A
Panicgrass	1	1	1	2	1	1	2	3	2	A	A	B	A	B	A	C	A	C
Partridgepea	3	1	1	1	2	2	1	3	1	A	A	B	C	C	C	C	C	C
Paspalum	1	1	1	2	2	2	3	3	3	A	A	B	A	C	C	C	A	C
Persimmon	1	3	1	1	1	1	2	3	1	C	B	C	C	C	B	B	C	A
Pine (seeds)	1	3	1	1	2	1	2	3	2	A	C	A	C	C	A	A	C	A
Plum	1	2	1	1	2	1	3	3	2	A	B	C	A	C	C	B	C	C
Pokeberry	1	1	1	1	1	1	2	3	2	B	A	C	A	C	C	B	C	C
Privet, common	1	1	1	1	1	1	1	3	2	B	B	C	C	C	C	A	C	C
Ragweed, common	1	2	1	1	1	1	2	3	2	A	B	A	C	C	C	C	A	C

TABLE 9.—*Suitability of plants for wildlife groups and as food for wildlife*—Continued

Plant	Wildlife groups									Food for—								
																Nongame birds [1]		
	1	2	3	4	5	6	7	8	9	Bobwhite	Deer	Dove	Rabbit	Squirrel	Turkey	Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Sassafras	1	2	1	1	1	1	2	3	2	B	A	C	C	B	B	A	C	C
Serviceberry	3	3	1	1	2	1	1	3	3	C	B	C	C	B	C	A	C	C
Sorghum	1	1	1	2	2	3	3	3	3	A	A	A	A	A	A	C	A	A
Soybean	2	2	1	3	2	3	3	3	3	B	A	B	B	C	C	C	A	C
Sudangrass	1	1	1	2	2	3	3	3	3	A	C	A	C	B	B	C	A	C
Sumac	2	2	1	1	2	1	2	3	2	B	A	C	B	C	B	A	A	A
Sunflower	2	1	1	2	3	2	3	3	3	A	A	A	C	C	A	C	C	A
Sweetgum	1	3	1	2	2	1	3	3	3	A	A	B	C	C	B	C	C	C
Tickclover (beggarweed)	1	1	1	1	1	1	2	2	2	A	A	A	C	B	B	C	C	C
Vetch (hairy)	1	2	1	2	2	3	3	3	3	A	A	B	C	C	B	C	C	C
Virginia creeper	1	3	1	2	1	1	3	3	2	C	B	C	C	A	C	A	C	A
Walnut	1	3	2	2	2	2	3	3	3	C	C	C	A	A	A	C	A	C
Wheat	1	1	1	2	2	1	3	3	2	A	A	A	A	A	A	C	A	C

[1] Among the fruit eaters are bluebirds, catbirds, robins, and mockingbirds; grain and seed eaters include blackbirds, cardinals, and sparrows; nut and acorn eaters include bluejays, chickadees, grackles, and woodpeckers.

Wildlife group 5

[redacted]

Wildlife group 8

This group consists of nearly level to steep, deep and

processes in horizon development. It also defines the current system for classifying soils.

Factors of Soil Formation

Soil is formed by the interaction of climate, living organisms, parent material, and [illegible]

Parent material

All of the hard-rock parent material in Washington County is of the Pennsylvanian and Mississippian Systems of the Paleozoic Era. On the Springfield Plateau it is cherty limestone. In the Boston Mountains it consists of acid sandstone, siltstone, and shale.

where geologic erosion has nearly kept pace with weathering.

Soils at the middle and lower elevations of the Boston Mountains formed in material derived from limestone that in places is underlain by calcareous shale. The shale is high in bases and weathers to a slightly acid to mildly alkaline clay or silty clay. Both the shale and the clay are slowly permeable and the bases leach slowly. Summit soils formed material, and the soils—Captina and Johnsburg soils, for example—are deep.

Deep soils also occur in coves and on foot slopes and mountain benches, in accumulations of soil material that has washed or slid down from adjoining steep slopes. Allen and Allegheny soils occur in such spots.

In level areas and in depressions on uplands and stream terraces, where surface drainage is slow or ponded, the

for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*8*). The system currently used by the National Cooperative Soil Survey was [illegible] 1965. It is under continual study. Readers

current system of classification, particularly in families, may change as more precise information becomes available.

New soil series must be established and concepts of some established series, especially older ones that have been used little in recent years, must be revised in the course of the soil survey program across the country. A proposed new series has tentative status until review of the series concept at national, State, and regional levels of responsibility for soil classification results in a judgment that the new series should be established. Most of the soil series described in this publication were established before this survey was

ORDER: In the order, soils are grouped according to properties that seem to result from the same processes acting to about the same degree on soil material. Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Ardisols, Mollisols, Spodosols, Al-

wide. The dissected areas, the largest of which are in the northeastern and northwestern parts of the county, are characterized by steep, V-shaped valleys that are 200 to 800 feet wide and are separated by long, narrow, winding, gently sloping ridges.

the plateau east of Springdale and in the northwestern part of the county.

A few small areas of Chattanooga Shale are exposed at

temperature (32° F.) in spring is April 13, and the average date of the first in fall is October 24. The latest that a temperature of 32° has been recorded is May 4 (in 1944).

inches, in 1923–24, is the heaviest that has been recorded. Severe local storms are infrequent, even though Washington County is near the high-frequency tornado areas in Oklahoma. Forty tornadoes were recorded in the 46-year period 1916–61 in Washington County and the 5 adjoining counties in northwestern Arkansas. Thunderstorms occur on an average of 56 days a year.

Water Supply

Washington County is well supplied with streams and lakes, but some streams are dry part of the year. The principal streams are the White River and its west fork and middle fork, the Illinois River, Cincinnati Creek, Cove Creek, Barren Fork, and Richland Creek. The principal lakes include Beaver, Wedington, Fayetteville, Sequoyah, and those in the Muddy Fork Watershed. All the

Most cattle produced in this county are sold to midwestern feedlots. Most broilers are processed at local plants. Concord grapes are processed into juice at a plant in Springdale, or are made into wine, or are sold as fresh fruit. Canneries at Springdale and Fort Smith are good markets for truck crops. There are good outlets for sawlog timber at local sawmills, but currently there is little local demand for pulpwood because of the expense of transportation.

Literature Cited

(1) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. 1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8. 2 v.,

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Clay. As a soil separate, mineral soil particles that are less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind, running water, and other geological agents.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleyed soil. A soil in which waterlogging and lack of oxygen have

Mapping unit. Areas of soil of the same kind outlined on the soil map and identified by a symbol.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many;* size—*fine*, *medium*, and *coarse;* and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. The disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The capacity of the soil to transmit air or water. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

Poorly graded soil. A soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles in poorly graded soil material, density can be increased only slightly by compaction.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values or words as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material from which a soil forms.

Sand. As a soil separate, individual rock or mineral fragments 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be any mineral composition. As a textural class, soil that is 85 percent or more sand and

and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay parti-

Tilth, soil. The condition of the soil, especially of the soil structure, in relation to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in tables as follows: